INSTRUCTION MANUAL

TM 614

TEST MESSAGE GENERATOR

TMG-3 SERIES

ATLANTIC RESEARCH

TELEPRODUCTS DEPARTMENT

SHIRLEY HIGHWAY AT EDSALL ROAD
ALEXANDRIA, VIRGINIA

TM 614

TEST MESSAGE GENERATOR

TMG-3 SERIES

September 1967

Manufactured
By
ATLANTIC RESEARCH CORPORATION
TELEPRODUCTS DEPARTMENT

ALEXANDRIA, VIRGINIA 22314
U.S.A.

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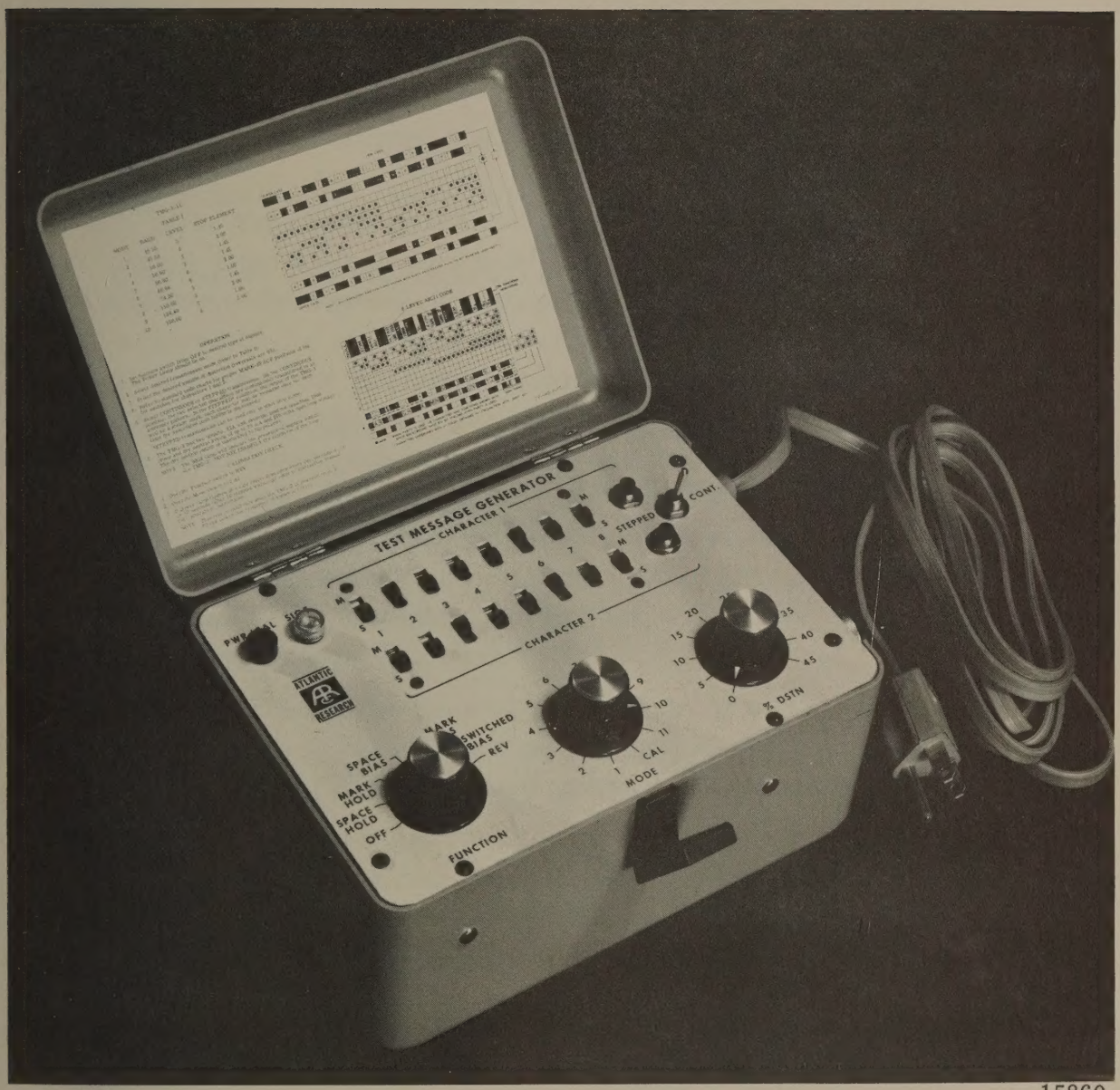


15860

Figure 1-1. Test Message Generator TMG-3 Series.

ERRATA October 1967

TP-SD-41515614, TP-AD-41523614, and Parts List:

Omit R62 and R63 (thereby eliminating -12V connection to transistors Q12 and Q13).

Add C11 and C12 in parallel with R24 and R28, respectively. C11 and C12 are 220 pF capacitors disc-type Stock No. 32450.

TP-SD-41510614, TP-AD-41521614, and Parts List:

Add PULSE SHAPER 635-1 as Y2. Pulse Shaper is to be connected between Pin 4 (TO XA3-15) and terminal 9 of Y1. Pulse Shaper must also have -12V and ground connections.

SECTION I

GENERAL DESCRIPTION

The Test Message Generator, TMG-3 Series, is a portable instrument used in testing telegraph and data transmission facilities and associated equipment. It is packaged in an impact-resistant metallic case. The TMG-3 generates any two teleprinter characters which are encoded by setting switches on the instrument panel to the desired positions for the character bits. The TMG-3 is available in nine models for various options of speed, stop element, and code level. Table 1-1 lists the models available and enumerates the mode options for each model. Transmission may be continuous, alternating between the two encoded characters, or the instrument may be set to transmit either character once for each time its STEPPED pushbutton is operated. In addition, space hold, mark hold, or undistorted reversals may be transmitted.

Controlled distortion may be introduced into the two character signals. Distortion is variable between zero and 45 percent in 5-percent increments and may be marking bias, spacing bias, or switched bias.

The TMG-3 has two output jacks which are located on the side of the instrument to keep the control panel clear of obstructions. A standard tip-sleeve jack provides access to the solid-state dry-contact keying for neutral loops of 10 to 110 milliamperes, in which the open loop voltage should not exceed 300 volts. The neutral output is polarity insensitive. Maximum marking voltage drop across the output keyer is 2 volts. A BNC connector provides access to the instrument-powered EIA signals. The instrument is capable of developing more than ±6 volts across a 1000 ohm load. EIA signal ground and instrument chassis ground are isolated.

Table 1-1. TMG-3 Model Variations.

Mode Control Position	WPM	Baud	Code Level	Stop Element
TMG-3-2				
1	60	45.5	5	1.5
2	53	45.5	6	2.0
3	66	50.0	5	1.5
4	75	56.9	5	1.5
5	66	56.9	6	2.0
6	100	74.2	5	1.5
7	100	110.0	8	2.0
TMG-3-3				
1	--	40.0	8	Synchro-nous
2	60	45.5	5	1.5
3	53	45.5	6	2.0
4	66	50.0	5	1.5
5	75	56.9	5	1.5
6	66	56.9	6	2.0
7	100	74.2	5	1.5
8	100	110.0	8	2.0
TMG-3-4				
1	60	45.5	5	1.5
2	53	45.5	6	2.0
3	75	56.9	5	1.5
4	66	56.9	6	2.0
5	--	66.7	6	1.0
6	100	74.2	5	1.5
7	--	135.0	8	2.0
TMG-3-5				
1	60	45.5	5	1.5
2	60	66.0	8	2.0
3	100	74.2	5	1.5
4	100	110.0	8	2.0
TMG-3-6				
1	60	45.5	5	1.5
2	53	45.5	6	2.0
3	66	50.0	5	1.5
4	75	56.9	5	1.5
5	66	56.9	6	2.0
6	83	66.7	6	1.0
7	100	74.2	5	1.5
8	100	110.0	8	2.0
9	150	135.0	8	2.0
10	150	150.0	8	1.0

Mode Control Position	WPM	Baud	Code Level	Stop Element
TMG-3-8				
1	60	45.5	5	1.5
2	53	45.5	6	1.5
3	56	50.0	5	1.5
4	75	56.9	5	1.5
5	66	56.9	6	1.5
6	83	66.7	6	1.0
7	100	74.2	5	1.5
8	87	74.2	6	1.5
9	150	135.0	6	2.0
10	150	150.0	8	1.0
TMG-3-9				
1	60	45.5	5	1.5
2	--	50.0	5	1.0
3	66	50.0	5	1.5
TMG-3-10				
1	--	66.7	6	1.0
2	--	135.0	6	2.0
TMG-3-11				
1	60	45.5	5	1.45
2	53	45.5	6	2.0
3	66	50.0	5	1.45
4	75	56.9	5	1.45
5	66	56.9	6	2.0
6	83	66.7	6	1.0
7	100	74.2	5	1.45
8	100	110	8	2.0
9	--	134.49	7	1.0
10	150	135	6	2.0
11	150	150	8	1.0

NOTE:

Other TMG-3 mode combinations may be programmed in accordance with customer's needs.

Table 1-2. Specifications.

Signal Outputs:	Neutral and EIA
Mode	Selectable. See Table 1-1.
Distortion	Zero to 45% (adjustable in 5% increments) Marking bias, spacing bias, or switched bias
Messages	Two characters (manually programmed) transmitted continuously Either character transmitted upon push-button actuation Undistorted reversals Mark hold Space hold
Output:	
Neutral	Nonpolarized solid-state dry-contact keying for 10 to 110-milliampere neutral loops at 300 volts (maximum) open loop voltage. Maximum marking drop is 2 volts.
EIA	Compatible with Electronic Industries Association 232B signal characteristics. Instrument supplies signal power to develop ±6 volts (minimum) across 1000-ohm load.
Isolation:	Signal grounds are isolated from instrument chassis ground
Power Requirements:	115 volts ± 10%, 60 Hz, 20 watts
Case Dimensions:	5 by 7 by 4 inches
Weight:	7 pounds
Temperature:	0 to 55°C ambient

SECTION II

INSTALLATION

The Test Message Generators TMG-3 are delivered ready for use. However, it is advisable to check the internal clock source using the following procedure:

a. Plug the power cord into a 115-volt ac outlet.

b. Turn the instrument on by moving the FUNCTION control switch from the OFF position to the REV position.

c. Set the MODE control switch to CAL. Allow 5 minutes for internal temperature stabilization of the instrument.

d. Observe the PWR/CAL indicator lamp. If the internal clock source is operating properly, the PWR/CAL indicator will fade on, then off, and then on again in ten or more seconds. If the indicator lamp cycles in less than 10 seconds, the clock source may need calibration according to the procedure given in Section V.

SECTION III

OPERATION

3-1. Controls and Indicators. Tables 3-1 and 3-2 list the controls and indicators used in the operation of the TMG-3.

Table 3-1. TMG-3 Controls.

Control	Position	Function
FUNCTION switch	OFF	Internal power supply is turned off. Internal power supply is turned on in all other FUNCTION switch positions.
	SPACE HOLD	Places dry-neutral keyer in open position and supplies EIA output with steady positive voltage.
	MARK HOLD	Places dry-neutral keyer in closed position and supplies EIA output with steady negative voltage.
	SPACE BIAS	Inserts spacing bias into transmitted character signals. The amount of spacing bias is determined by the setting of the % DSTN switch. Control of transmitted characters is determined by the settings of the STEPPED-CONT. switch and the STEPPED pushbuttons.
	MARK BIAS	Inserts marking bias into transmitted character signals. The amount of marking bias is determined by the setting of % DSTN switch. Control of transmitted characters is determined by the settings of the STEPPED-CONT. switch and the STEPPED pushbuttons.
	SWITCHED BIAS	Inserts spacing bias into CHARACTER 1 signal and marking bias into CHARACTER 2 signal.

Table 3-1. TMG-3 Controls. (Cont'd)

Control	Position	Function
FUNCTION switch (cont'd)	REV	If the STEPPED-CONT. switch is on CONT., sets instrument to transmit undistorted reversals. Speed of the reversals is determined by the setting of the MODE switch. Note: If STEPPED-CONT. switch is on STEPPED, there will be no output.
MODE switch	1 thru 11	Selects the mode of instrument transmission, i.e., speed, code level, and stop element length, as listed in Table 1-1 and on the inside cover of each instrument.
	CAL	Used for calibration and accuracy checks of the instrument.
% DSTN switch	--	Inserts indicated percentage distortion into character signal transmissions (if any). Type of distortion and/or signal transmission controlled by setting of FUNCTION switch.
CHARACTER 1 switches (row of eight switches located at top of panel)	1 thru 8	Indicated number refers to bit position in character. A switch in the M (up) position sets indicated bit to marking. A switch in the S (down) position sets indicated bit to spacing. For signal modes having code levels of less than eight, only the positions of switches 1 through the code-level number are significant. Code level transmitted is determined by the setting of the MODE switch.
CHARACTER 2 switches (row of eight switches located below CHARACTER 1 switches)	1 thru 8	Sets bit information for CHARACTER 2 as described above.
STEPPED-CONT. switch	STEPPED	Provides transmission of a single character when either of the STEPPED pushbuttons is pressed, but only if FUNCTION switch is set on SPACE BIAS, MARK BIAS, or SWITCHED BIAS.

Table 3-1. TMG-3 Controls. (Cont'd)

Control	Position	Function
STEPPED-CONT. switch (cont'd)	CONT.	Provides continuous sequential transmission of the two characters encoded in the CHARACTER 1 and CHARACTER 2 switches, but only if FUNCTION switch is set on SPACE BIAS, MARK BIAS, or SWITCHED BIAS. If FUNCTION switch is set on REV, STEPPED-CONT. switch must be set on CONT. for transmission of reversals.
STEPPED pushbuttons	row 1	When pressed, provides a single transmission of CHARACTER 1, but only if STEPPED-CONT. switch is set on STEPPED and FUNCTION switch is set on SPACE BIAS, MARK BIAS, or SWITCHED BIAS.
	row 2	When pressed, provides a single transmission of CHARACTER 2, but only if STEPPED-CONT. switch is set on STEPPED and FUNCTION switch is set on SPACE BIAS, MARK BIAS, or SWITCHED BIAS.

Table 3-2. TMG-3 Indicators.

Indicator	Condition	Indication
PWR/CAL lamp	Unlighted	Internal power supply is OFF.
	Lighted, with MODE switch set to a numeral	Internal power supply is on.
	Fading on and off, with MODE switch set to CAL	Indicates phase shift between 60-Hz external power and internal clock source. Normally, the light will fade on and off very slowly; several seconds will elapse after the light goes off until it goes back on.

Table 3-2. TMG-3 Indicators. (Cont'd)

Indicator	Condition	Indication
SIGS lamp	Lighted	Indicates that transmission to output circuits is spacing. Neutral keyer should be open and EIA output should be positive.
	Unlighted	Indicates that transmission to output circuits is marking. Neutral keyer should be closed and EIA output should be negative.
	Blinking	Indicates that lamp is following signal containing both mark and space bits.

3-2. Operating Procedure. To use the TMG-3 to provide signals for testing telegraph or data transmission equipment, use the following procedure:

a. Plug the power cord into a 115-volt ac outlet.

b. Set the FUNCTION control switch to the desired type of signals.

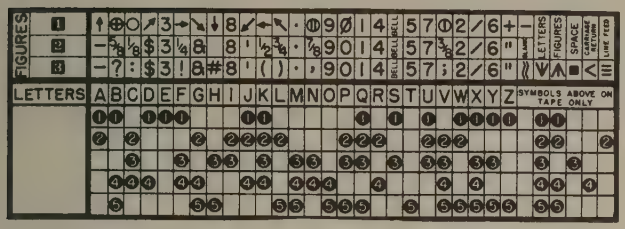
c. Set the MODE switch to the desired numerical position. Refer to the MODE chart in the cover of the instrument or to Table 1-1 of this manual to determine the mode of operation associated with each numerical position of the switch. (Each numerical position represents a specific combination of speed, code level, and stop element.)

d. Set up the bit sequence on the CHARACTER 1 and CHARACTER 2 switches for the desired two characters to be transmitted. Standard code charts for most frequently used codes are given in the cover of the instrument. Standard charts for 5-, 6-, 7-, and 8-level codes are given in Table 3-3.

e. Set the % DSTN switch to the desired distortion level. (Reversals are transmitted without distortion regardless of the position of the % DSTN switch.)

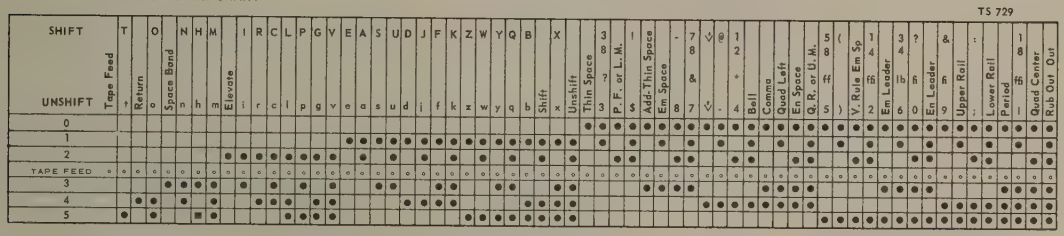
Table 3-3. Teleprinter Code Charts.

FIVE-LEVEL BAUDOT

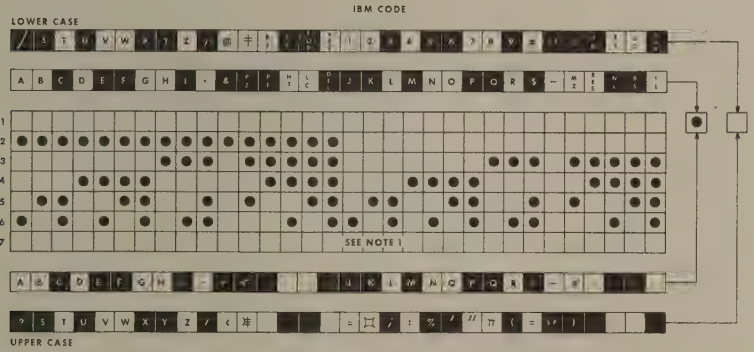


SIX-LEVEL CODE CHART

TS 729

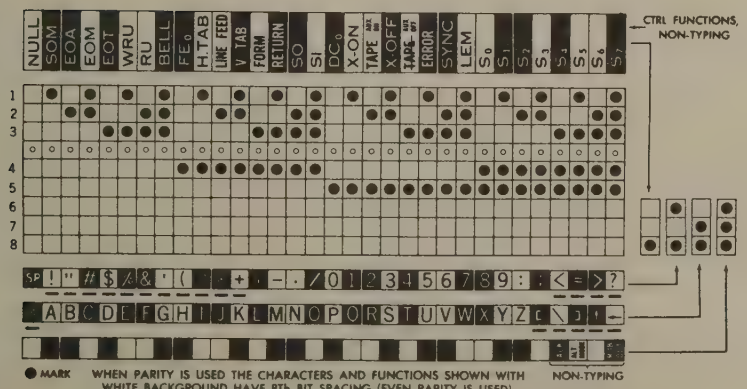


IBM CODE



NOTE 1: ALL CHARACTERS AND FUNCTIONS SHOWN WITH BLACK BACKGROUND HAVE 7th BIT MARKING (ODD PARITY).

EIGHT-LEVEL ASCII CODE



● MARK WHEN PARITY IS USED THE CHARACTERS AND FUNCTIONS SHOWN WITH WHITE BACKGROUND HAVE 8th BIT SPACING (EVEN PARITY IS USED).

CHARACTERS UNDERLINED WITH — (DASH) OBTAINED IN CONJUNCTION WITH "SHIFT" KEY.

f. Observe the condition of the SIGS lamp. Note, however, that the SIGS lamp indicates the presence of signals within the TMG-3 and not necessarily the condition of the loop.

g. Connect the circuit or equipment to be tested to the proper TMG-3 output. Neutral loops are connected by means of a standard tip-sleeve telephone patch cord. EIA loops are connected by means of a standard BNC connector plug.

WARNING

Neutral loop parameters must not exceed 300 volts open loop voltage or 110 milliamperes loop current. Excessive voltage or current may cause severe damage to the output keyer.

NOTE

The neutral output of the TMG-3 is a solid-state dry-neutral keyer. Loop power must be obtained externally.

NOTE

EIA loop voltage is supplied by the instrument power supply.

SECTION IV

THEORY OF OPERATION

The TMG-3 is a self-contained instrument packaged in an impact-resistant metallic case. Its internal dc power supply requires only standard 115-volt ac input. Digital solid-state logic is used throughout. The instrument contains a highly accurate clock source capable of operating the TMG-3 over a range from 35 to 150 baud ± 0.5%.

Because it is recommended that the instrument be returned to the factory for repair or maintenance requiring component replacement, no detailed theory of operation of the internal circuits is given in this manual. Schematic and assembly diagrams of the TMG-3 circuits are included in Section VII.

SECTION V

MAINTENANCE

5-1. Calibration. Calibration of the clock source should be checked periodically according to the procedure given in Section II. Should it be necessary to recalibrate the clock source, use the following procedure:

NOTE

Calibration of the internal clock source shall be attempted only when the frequency of the 60-Hz power line is known to be accurate.

a. Plug the instrument power cord into a 115-volt ac outlet.

b. Turn power on by moving the FUNCTION switch from the OFF position to the REV position.

c. Set the MODE control to the CAL position and allow 5 minutes for internal temperature stabilization of the instrument.

d. Take the instrument out of the case by removing four binding-head screws located on the sides of the case and, immediately after removal, adjust R21, located in printed circuit board number 2, until the PWR/CAL indicator lamp fades on, fades off, and fades on again in 10 seconds or longer.

5-2. Fuse Replacement. The instrument contains a 1/4-amp AGC-3 fuse located on the side of the instrument.

5-3. Repair. The TMG-3 is a compact, miniaturized instrument for which only factory repair is recommended.

SECTION VI
PARTS LIST

PARTS LIST

ATLANTIC RESEARCH CORPORATION

TELEPRODUCTS DIVISION — ALEXANDRIA, VIRGINIA

PARTS LIST NO. 614
SHEET 1 OF 20 SHEETS

		APPROVED	DATE
PROJ ENG	A Quinn		8-1-67
CHECKED			
PREPARED			11/2

SUBJECT: TEST MESSAGE GENERATOR TMG-3

UNLESS OTHERWISE SPECIFIED ALL REFERENCES TO COMMERCIAL TYPES, STYLES, TRADE NAMES, AND CATALOGS ARE INTENDED TO BE DESCRIPTIVE AND NOT RESTRICTIVE AND ONLY TO INDICATE THE CHARACTERISTICS OF SATISFACTORY ARTICLES.

LTR.	REVISION DESCRIPTION	DATE	APPD.	LTR.	REVISION DESCRIPTION	DATE	APPD.
A	Item #188 - Deleted. Item #189 - Added Q1, Q4 Thru Q7. Item #262 - Changed To #2N3709, Item 145 was Total Qty 21, Per DCN #529	8-22-67	AD				
B	Item 145 changed qty from 14 to 13 added item #146. Deleted R51 and R56 on item #154 and added 2 diodes on item #142. Deleted item #156 and added 2 resistors to item #149, per DCN #532	8-31-67	AD				
C	Item #183, changed qty from 12 to 11 and added item #186 Item #139 changed qty. from 10 to 8 and added item #140 item #149 and #150 changed qty. per DCN 537	8-31-67	AD				
D	Deleted item #248, #249 and #252, and added 11 capacitors to item #251 Added 9 resistors to item #267 and deleted 9 resistors from item 271 per DCN 526	8-31-67	AD				

RECORD OF REVISION STATUS OF EACH SHEET

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
A						A		A																																	
B					B																																				
C						C																																			
D								D	D																																

DWG. NO., PART NO., OR OTHER IDENTIFICATION	GROUP NO. AND QUANTITY 1	2	3	4	5	6	TOTAL PIECES OR QUANTITY	NOMENCLATURE	REF. DESIG.	ITEM NO.
TP-FD-	--						--	Face Drawing		1
TP-WD-	--						--	Wiring Diagram		2
TP-SD-41512614	--						--	Schematic Diagram, TMG Control Panel		3
TP-SD-41513614	--						--	Schematic Diagram		4
TP-SD-41515614	--						--	Schematic Diagram, Board #1		5
TP-SD-41510614	--						--	Schematic Diagram, Board #2		6
TP-SD-41511614	--						--	Schematic Diagram, Boards #3 & 5		7
										8
										9
										10
										11
TP-FA-41520614	1						--	Test Message Generator Assembly		12
TP-AD-41519614		1					1	Case And Cover Assembly		13
TP-41517614			1				1	Case		14
33234				1			1	Case, Drawn, #Z80-112A x 51; Zero Mfg. Co		15
TP 41106489			1				1	Cover		16
33235				1			1	Cover Drawn #80 112A 16 CF, Zero Mfg Co		17
33786			1				1	Draw Catch, Q 10 101 12, Southco Div		18
				4			4	Rivet CSK Head, Sem-Tub Alum 3 32 Dia x 9 32 Lg		19
33503			1				1	Handle Assy, Black, Y-11458, 5-1/4 Lg, w/Polished Special Nickel Plated Steel End Pcs, Style 4825, Philadelphia Handle Company		20
			4				4	Rivet, Button Head, Semi-Tub, N P Brass, 1 8 Dia x 13 32 Lg		21

#Pieces marked as such appear more than once. PIECE TOTAL AMOUNT IS SHOWN ON FIRST LISTING.

PARTS LIST

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TELEPRODUCTS DIVISION ALEXANDRIA, VIRGINIA

PARTS LIST NO. 614
SHEET 2 OF SHEETS

APPROVED		DATE
PROJ ENG	[illegible]	8-1-67
CHECKED		
PREPARED	[illegible]	7/31/67

SUBJECT:
TEST MESSAGE GENERATOR
TMG-3

* SEE ADDENDUM SHEETS FOR MODEL VARIATIONS

UNLESS OTHERWISE SPECIFIED ALL REFERENCES TO COMMERCIAL TYPES, STYLES, TRADE NAMES, AND CATALOGS ARE INTENDED TO BE DESCRIPTIVE AND NOT RESTRICTIVE AND ONLY TO INDICATE THE CHARACTERISTICS OF SATISFACTORY ARTICLES.

DWG. NO., PART NO., OR OTHER IDENTIFICATION	GROUP NO. AND QUANTITY 1	2	3	4	5	6	TOTAL PIECES OR QUANTITY	NOMENCLATURE	REF. DESIG.	ITEM NO.
										23
										24
33509			2				2	Hinge, Butt, Alum, #B-56A; Homer D. Bronson Co.		25
				8			8	Rivet, CSK Head, Semi-Tub, Alum, 1/8 Dia x 5/32 lg.		26
33788			4				4	Bumper, Rubber, Button Type, #BUT-407; Russell Industries, Inc.		27
										28
										29
TP-SA-41518614		1					* 1	Front Panel Assembly		30
TP-41500614 (3 Shts)			1				1	Front Panel Marking		31
TP-41500614 – Sht. 1							REF	Front Panel		32
TP-41500614 – Shts. 2 & 3							REF	Front Panel, Silkscreen		33
33088			1				1	Fuseholder, #341001; Littelfuse Inc.	XF1	34
33078				1			1	Fuse, 1/4 Amp; #AGC-3; Bussman Mfg. Co.	F1	35
33172			1				1	Jack, Telephone, Insulated Bushing, #N-112A; Switchcraft Inc.	J1	36
33802			1				1	Power Cord, 3 Wire, Flat, Gray, 7 Ft. Lg., #M10771; Phalo Plastics, Inc.	P1	37
33012			1				1	Light, Indicator, White, #101BWXXW1; Display Devices, Inc.	XDS1	38
33011			1				1	Light Display, Red, #101BWXXR1; Display Devices, Inc.	XDS2	39
33058				2			2	Lamp, Unbased, 10V, 27 MA, #74; Display Devices, Inc	DS1, DS2	40
			2				2	Screw, Mach, Socket, BH, Steel Black Oxide, #4-40NC-2 x 3/8 Lg; Steel Specialties, Inc.		41
			4				4	Screw, Mach, Socket, BH, Steel, Black Oxide, #4-40NC-2 x 5/16 Lg; Steel Specialties, Inc		42
TP-AD-31169489			1				1	Switch Rotary Assembly, S1		43
TP-21622489				1			1	Switch, Rotary, 3 Section	S1	44
TP-31312614			1				1	Printed Circuit Board, #4		45
TP-PC-80369614				1			1	Printed Circuit Board Artwork, Board #4		46
								(SEE ADDENDUM SHEETS FOR MODEL VARIATIONS)		
33111			1				#3	Knob, #DS-70-3-2; Raytheon Ind, Comp Div.		47
										48
TP-AD-31168489			1				1	Switch, Rotary, Assembly, S2		49
TP-21621489				1			#2	Switch, Rotary	S2	50
33111			1				#	Knob, #DS-70-3-2; Raytheon Ind. Comp Div		51
										52
TP-AD-31163489			1				1	Switch, Rotary, Assembly, S3		53
TP-21621489				1			#	Switch, Rotary	S3	54
33111			1				#	Knob, #DS-70-3-2; Raytheon Ind. Comp Div		55
										56
			2				2	Switch, Pushbutton, #201, Switchcraft Inc	S4, S5	57
										58

#Pieces marked as such appear more than once. PIECE TOTAL AMOUNT IS SHOWN ON FIRST LISTING.

PARTS LIST

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SUBJECT: TEST MESSAGE GENERATOR TMG-3

UNLESS OTHERWISE SPECIFIED ALL REFERENCES TO COMMERCIAL TYPES, STYLES, TRADE NAMES, AND CATALOGS ARE INTENDED TO BE DESCRIPTIVE AND NOT RESTRICTIVE AND ONLY TO INDICATE THE CHARACTERISTICS OF SATISFACTORY ARTICLES.

DWG. NO., PART NO., OR OTHER IDENTIFICATION	GROUP NO. AND QUANTITY 1	2	3	4	5	6	TOTAL PIECES OR QUANTITY	NOMENCLATURE	REF. DESIG.	ITEM NO.
			1				1	Switch, Toggle, DPDT , #MST-205; Alco Electronic Products Inc.	S6	59
										60
TP-AD-41505614			1				1	Printed Circuit Board Assembly, Bd 5		61
TP-41504614 (2 Shts)				1			1	Printed Circuit Board #5		62
TP-PC-80361614					1		1	Printed Circuit Artwork, Bd. #5		63
TP-21729614-1				2			2	Switch, Slide, #G-124; (Modified); Continental Wirt Electronics Corp.	S1, S15	64
TP-21729614-2				2			2	Switch, Slide, #G-124; (Modified); Continental Wirt Electronics Corp.	S2, S16	65
TP-21729614-3				12			12	Switch, Slide, #G-124; (Modified); Continental Wirt Electronics Corp.	S3 Thru S14	66
32514, 32501				16			98	Diode, Silicon, ARC Spec 1-1-2; Or #1N461A; Sylvania Electric Products Inc.	CR1 Thru CR16	67
										68
										69
										70
										71
TP-SA-41105489		1					1	Card Guide Assembly		72
TP-31164489			1				1	Plate, Rear		73
TP-31167489			1				1	Specification dwg, Card Guide Assy - Left		74
TP-21620489				2			#4	Mounting Bar		75
				3			#6	Card Guide, #T-301-51; Scanbe Mfg. Co		76
33804				3			#6	In-Line Foot, #T-305-U; Scanbe Mfg. Co.		77
33806				4			#8	Spacer, #T-101-250; Scanbe Mfg Co		78
33817				2			#4	Spacer, #T-101-125; Scanbe Mfg. Co		79
33805				2			#4	Spacer, #T-101-562; Scanbe Mfg. Co.		80
										81
										82
TP-31166489			1				1	Specification Dwg, Card Guide Assy - Right		83
TP-21620489				2			"	Mounting Bar		84
				3			"	Card Guide, #T 301-51, Scanbe Mfg Co		85
33804				3			"	In-Line Foot, #T-305-U; Scanbe Mfg. Co.		86
33806				4			"	Spacer, #T-101-250; Scanbe Mfg. Co.		87
33817				2			"	Spacer, #T-101-125; Scanbe Mfg. Co.		88
33805				2			"	Spacer, #T-101-562; Scanbe Mfg. Co.		89
										90
33312			3				3	Connector, Printed Circuit, 44 Pin; #251-22-30-160; Cinch-Jones	J1,J2,J3	91
			4				4	Screw, Mach, Pan Hd, SS, #4-40NC-2 x 9/32 Lg.		92
			6				6	Screw, Mach, Pan Hd, SS, #4-40NC-2 x 3/8 Lg.		93
			6				6	Lockwasher, Internal Tooth, SS, #4		94
			4				#5	Lockwasher, Split, SS, #4		95

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TP-616-7.66

PARTS LIST

ATLANTIC RESEARCH CORPORATION

TELEPRODUCTS DIVISION ALEXANDRIA, VIRGINIA

PARTS LIST NO. 614
SHEET 4 OF SHEETS

APPROVED		DATE
PROJ ENG	[illegible]	8 1 62
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PREPARED	[illegible]	7/30/62

SUBJECT: TEST MESSAGE GENERATOR TMG-3

UNLESS OTHERWISE SPECIFIED ALL REFERENCES TO COMMERCIAL TYPES, STYLES, TRADE NAMES, AND CATALOGS ARE INTENDED TO BE DESCRIPTIVE AND NOT RESTRICTIVE AND ONLY TO INDICATE THE CHARACTERISTICS OF SATISFACTORY ARTICLES.

DWG. NO., PART NO., OR OTHER IDENTIFICATION	GROUP NO. AND QUANTITY 1	2	3	4	5	6	TOTAL PIECES OR QUANTITY	NOMENCLATURE	REF. DESIG.	ITEM NO.
										96
										97
33752		1					1	Nameplate (TP-31007000)		98
										99
										100
										101
TP-41492489		1					1	Retainer		102
		1					1	TMG-3 Instructions		103
			4				4	Screw, Mach, Pan Hd, SS, #4-40NC-2 x 3/16 Lg.		104
			6				6	Screw, Mach, Socket, BH, Steel, Black Oxide, #4-40NC-2 x 5/16 Lg., Steel Specialties Inc.		105
			1				1	Screw, Mach, Pan Hd, #4-40NC-2 x 1/4 Lg.		106
			1				#	Lockwasher, Split, SS, #4		107
										108
										109
										110
										111
										112
										113
										114
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										116
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										131
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PARTS LIST

ATLANTIC RESEARCH CORPORATION

TELEPRODUCTS DIVISION — ALEXANDRIA, VIRGINIA

PARTS LIST NO. 614 SHEET 5 OF SHEETS

APPROVED		DATE
PROJ ENG	Asmus	8-1-67
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PREPARED	[illegible]	7/30/67

SUBJECT: TEST MESSAGE GENERATOR TMG-3

UNLESS OTHERWISE SPECIFIED ALL REFERENCES TO COMMERCIAL TYPES, STYLES, TRADE NAMES, AND CATALOGS ARE INTENDED TO BE DESCRIPTIVE AND NOT RESTRICTIVE AND ONLY TO INDICATE THE CHARACTERISTICS OF SATISFACTORY ARTICLES.

DWG. NO., PART NO., OR OTHER IDENTIFICATION	GROUP NO. AND QUANTITY 1	2	3	4	5	6	TOTAL PIECES OR QUANTITY	NOMENCLATURE	REF. DESIG.	ITEM NO.
TP-AD-41523614		1					1	Printed Circuit Board Assy, Board #1		133
TP-DA-41547614 (2 Shts)			1				1	Printed Circuit Board, Board #1		134
TP-PC2-80363614 (2 Shts)				1			1	Printed Circuit Artwork, Board #1		135
										136
33755			1				#3	Ejector, White, W/Spiral Pin, #S-200, Scanbe Mfg. Co		137
										138
32435			8				#14	Capacitor, Fixed, Ceramic Disc, 680 pF, 1000 WVDC, ±20%, #40C212A, (5GA-T68); Sprague Electric Co	C1 thru C6 C9, C10	139
32451			2				2	Capacitor, Fixed, Ceramic Disc, 270pf, 1000 WVDC, 20%, #40C93, (5GA-T27); Sprague Elec. Co	C7, C8	140
										141
32514 32501			40				#	Diode, Silicon, ARC Spec 1-1-2, or #1N461A, Sylvania Electric Products Inc	CR1 Thru CR40	142
										143
										144
32665			13				13	Transistor, Silicon, #2N3565, Fairchild Semiconductor Div	Q1 Thru Q11, Q13, Q14	145
32705			1				1	Transistor, Silicon, #2N3646, Motorola Semiconductor Div	Q12	146
										147
30082			5				#17	Resistor, Fixed, Comp, 22K, 1/4 w, ±10%, Type GBT, IRC	R1, R2, R11, R16, R20	148
30078			26				#50	Resistor, Fixed, Comp, 10K, 1/4 w, ±10%, Type GBT, IRC	R3-R6, R9, R10, R24, R28, R32-R35, R38, R42, R46, R49, R53, R17, R22, R25, R30 R52, R54, R57, R61 R58	149
30084			6				#11	Resistor, Fixed, Comp, 47K, 1/4 w, ±10%, Type GBT, IRC	R7 R8 R13 R14, R43, R48 R43 R48	150
			1				1	Resistor, Fixed, Comp, 1 Meg, 1/4 w, ±10%, Type GBT, IRC	R12	151
30077			2				#13	Resistor, Fixed, Comp, 4.7K, 1/4 w, ±10%, Type GBT, IRC	R19 R21	152
30085			10				#16	Resistor, Fixed, Comp, 100K, 1/4 w, ±10%, Type GBT, IRC	R18, R19, R26, R27, R31, R36, R39, R44, R45, R60	153
30076			7				#11	Resistor, Fixed, Comp, 3.3K, 1/4 w, ±10%, Type GBT, IRC	R23, R29, R37, R40, R41, R47, R59	154
30075			2				2	Resistor, Fixed, Comp, 2.7K, 1/4 w, ±10%, Type GBT, IRC	R50, R55	155
										156
			2				2	Resistor, Fixed, Comp, 39K, 1/4 w, ±10%, Type GBT, IRC	R62, R63	157
										158
										159
33173			1				1	Test Point, Horizontal, Brown, #105-758, E.F. Johnson Co	J1	160
33166			1				1	Test Point, Horizontal, Red, #105-752, E.F. Johnson Co	J2	161
33174			1				1	Test Point, Horizontal, Orange, #105-756, E.F. Johnson Co	J3	162
										163
										164
										165

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PARTS LIST

ATLANTIC RESEARCH CORPORATION

TELEPRODUCTS DIVISION — ALEXANDRIA, VIRGINIA

PARTS LIST NO. 614
SHEET 6 OF ____ SHEETS

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PROJ ENG	A Quinn	2-1-62
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PREPARED	E Sh	7/31/62

SUBJECT: TEST MESSAGE GENERATOR TMG-3

UNLESS OTHERWISE SPECIFIED ALL REFERENCES TO COMMERCIAL TYPES, STYLES, TRADE NAMES, AND CATALOGS ARE INTENDED TO BE DESCRIPTIVE AND NOT RESTRICTIVE AND ONLY TO INDICATE THE CHARACTERISTICS OF SATISFACTORY ARTICLES.

DWG. NO., PART NO., OR OTHER IDENTIFICATION	GROUP NO. AND QUANTITY 1	2	3	4	5	6	TOTAL PIECES OR QUANTITY	NOMENCLATURE	REF. DESIG.	ITEM NO.
TP-AD-41521614		1					1	Printed Circuit Board Assy, Board #2		166
TP-DA-41548614 (2 Shts)			1				1	Printed Circuit Board, Board # 2		167
TP-PC2-80362614 (2 Shts)				1			1	Printed Circuit Artwork, Board #2		168
										169
33755			1				#	Ejector, White, W/Spirol Pin, #S-200; Scanbe Mfg. Co.		170
										171
32259			1				#4	Capacitor, Fixed, Flat Foil, .1 Mfd, 250 WVDC, ±10%; #C280AE/A100K; Amperex Electronic Corp.	C1	172
32134			1				1	Capacitor, Electrolytic, 400 Mfd, 40 WVDC, –10%,+50%; #C437AR/G400; Amperex Electronic Corp.	C2	173
32135			2				2	Capacitor, Electrolytic, 250 Mfd, 16 WVDC, –10%,+50%; #C437 AR/E250; Amperex Electronic Corp.	C3,C4	174
32435			4				#	Capacitor, Fixed, Ceramic Disc, 680 pF, 1000 WVDC, ±20%; #40C212A (5GA T68), Sprague Electric Co.	C5,C6,C9,C10	175
32137			1				1	Capacitor, Electrolytic, 250 Mfd, 40 WVDC,–10%,+50%; #C437AR, G250; Amperex Electronic Corp.	C7	176
32325			1				#2	Capacitor, Fixed, Ceramic Disc, .001 Mfd, 1000 WVDC, ±20%; #40C214A (5GA-D10); Sprague Electric Co.	C8	177
										178
										179
32515			5				5	Diode, Silicon, #1N4001; Motorola Semiconductor Div.	CR1-CR4,CR11	180
32618			1				1	Diode, Silicon, Zener, 1W, 10V, ±5%; #1N3020B; Motorola Semiconductor Div.	CR5	181
32619			1				1	Diode, Silicon, Zener, 1 W, 12V, ±5%; #1N3022B, Motorola Semiconductor Div.	CR6	182
32514/32501			11				#	Diode, Silicon, ARC Spec 1-1-2 Or #1N461A; Sylvania Electric Products Inc.	CR7 Thru CR10, CR18 Thru CR24	183
32523			4				4	Diode, Silicon, #1N4003, Motorola Semiconductor Div.	CR13-CR16	184
32617			1				1	Diode, Silicon, Zener, 3W, 300 V, #UZ230; Unitrode Transistor Prods. Corp.	CR17	185
32525/			1				1	Diode, Silicon, ARC Spec 1-1-6 or #1N914, Sylvania Electric Products Inc.	CR25	186
										187
										188
32670			9				9	Transistor, Silicon, #2N3567; Fairchild Semiconductor Div.	Q1, Q4 Thru Q7 Q2, Q9 Thru Q11	189
32732			1				1	Transistor, Silicon, #MJE340, Motorola Semiconductor Div.	Q3	190
			2				3	Transistor, Silicon, #2N3638, Fairchild Semiconductor Div	Q8,Q12	191
										192
										193
			1				1	Resistor, Fixed, WW, 10 Ohms, 2 W, ±10%, Type BWH, IRC	R1	194
30961			1				1	Resistor, Fixed, WW, 47 Ohms, 2 W, ±10%, Type BWH, IRC	R2	195
30082			12					Resistor, Fixed, Comp; 22K, 1/4 w, ±10%; Type GBT, IRC	R3-R6,R9,R13, R15,R18,R20,R24, R26,R29	196
30070			2				2	Resistor, Fixed, Comp, 100 Ohms, 1/4 w, ±10%, Type GBT, IRC	R10,R33	197
30078			6				"	Resistor, Fixed, Comp; 10K, 1/4 w, ±10%; Type GBT, IRC	R11,R19,R23, R32,R35,R37	198
30065			2				2	Resistor, Fixed, Comp; 3.9K, 1/4 w, ±10%, Type GBT, IRC	R12,R30	199
30074			1				23	Resistor, Fixed, Comp, 2.2K, 1/4 w, ±10%, Type GBT, IRC	R14	200
30085			5					Resistor, Fixed, Comp, 100K, 1/4 w, ±10%; Type GBT, IRC	R16,R21,R22, R28,R38	201

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PARTS LIST

ATLANTIC RESEARCH CORPORATION

TELEPRODUCTS DIVISION ALEXANDRIA, VIRGINIA

PARTS LIST NO. 614
SHEET 7 OF SHEETS

		DATE
APPROVED	[illegible]	8-1-67
CHECKED		
PREPARED	[illegible]	7/31/67

SUBJECT: TEST MESSAGE GENERATOR TMG-3

UNLESS OTHERWISE SPECIFIED ALL REFERENCES TO COMMERCIAL TYPES, STYLES, TRADE NAMES, AND CATALOGS ARE INTENDED TO BE DESCRIPTIVE AND NOT RESTRICTIVE AND ONLY TO INDICATE THE CHARACTERISTICS OF SATISFACTORY ARTICLES.

DWG. NO., PART NO., OR OTHER IDENTIFICATION	GROUP NO. AND QUANTITY 1	2	3	4	5	6	TOTAL PIECES OR QUANTITY	NOMENCLATURE	REF. DESIG.	ITEM NO.
30076			2				-	Resistor, Fixed, Comp; 3.3K, 1/4 w, ±10%; Type GBT, IRC	R17,R25	202
30084			1				-	Resistor, Fixed, Comp, 47K, 1/4 w, ±10%, Type GBT, IRC	R27	203
30077			2					Resistor, Fixed, Comp, 4.7K, 1/4 w, ±10%; Type GBT, IRC	R31, R39	204
30072			1				.21	Resistor, Fixed, Comp; 1K, 1/4 w, ±10%, Type GBT, IRC	R34	205
			1				1	Resistor, Fixed, Comp, 330 Ohms, 1/4 w, ±10%; Type GBT, IRC	R36	206
32805			1				1	Resistor, Variable, WW, 15 Turn, 2K, 1/2 w, ±10%, #3068P-1-202; Bourns, Inc	R7	207
										208
										209
33192			1				1	Transformer (TP-21631000)	T1	210
				2			2	Screw, Mach, Pan Hd, SS, #6-32NC-2 x 3/8 Lg		211
				2			2	Washer, Flat, SS, #6		212
				2			2	Lockwasher, Split, SS, #6		213
				2			2	Nut, Mach, Hex, SS, #6-32NC-2		214
										215
										216
PL-499			1				1	Module, Stable Oscillator, #499-3	Y1	217
										218
										219
33119			1				2	Test Point, Vertical, Brown, #105-858; E.F. Johnson Co	J1	220
33120			1				2	Test Point, Vertical, Red, #105-852, E.F. Johnson Co	J2	221
33122			1				1	Test Point, Vertical, Orange, #105-856, E.F. Johnson Co	J3	222
33121			1				1	Test Point, Vertical, Yellow, #105-857, E.F. Johnson Co	J4	223
										224
										225
										226
										227
										228
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ATLANTIC RESEARCH CORPORATION

TELEPRODUCTS DIVISION — ALEXANDRIA, VIRGINIA

PARTS LIST NO. 614
SHEET 8 OF ____ SHEETS

	APPROVED	DATE
PROJ ENG	[illegible]	8-1-62
CHECKED		
PREPARED	[illegible]	[illegible]

SUBJECT: TEST MESSAGE GENERATOR TMG-3

UNLESS OTHERWISE SPECIFIED ALL REFERENCES TO COMMERCIAL TYPES, STYLES, TRADE NAMES, AND CATALOGS ARE INTENDED TO BE DESCRIPTIVE AND NOT RESTRICTIVE AND ONLY TO INDICATE THE CHARACTERISTICS OF SATISFACTORY ARTICLES.

DWG. NO., PART NO., OR OTHER IDENTIFICATION	GROUP NO. AND QUANTITY 1	2	3	4	5	6	TOTAL PIECES OR QUANTITY	NOMENCLATURE	REF. DESIG.	ITEM NO.
TP-AD-41514614		1					1	Printed Circuit Board Assy, Board #3		239
TP-DA-41516614 (2 Shts)			1				1	Printed Circuit Board, Board #3		240
TP-PC2-80360614 (2 Shts)				1			1	Printed Circuit Artwork, Board #3		241
33755			1				#	Ejector, White, W/Spirol Pin, #S-200; Scanbe Mfg. Co.		242
33414			2				2	Terminal, Solder, Pin; #1132-2; Cambridge Thermionic Corp.	E1,E2	243
33415			1				1	Jumper Clip, #3610346; Malco Mfg. Co., Inc.		244
										245
										246
32259			3				#	Capacitor, Fixed, Flat Foil, .1 Mfd, 250 WVDC, ±10%; #C280AE/A100K; Amperex Electronic Corp	C1,C13,C14	247
										248
										249
32325			1				#	Capacitor, Fixed, Ceramic Disc, .001 Mfd, 1000 WVDC, ±20%; #40C214A(5GA-D10); Sprague Electric Co.	C12	250
32260			23				23	Capacitor, Fixed, Flat Foil, .01 Mfd, 250 WVDC, ±10%; #C280AE/A10K; Amperex Electronic Corp.	C2 Thru C11, C15 Thru C26,C27	251
										252
32421			1				1	Capacitor, Fixed, Mylar, .0015 Mfd, 200 WVDC, ±10%; #WMF2D15; Cornell-Dubilier Electronics	C28	253
										254
										255
32514/32501			32				#	Diode, Silicon, ARC Spec 1-1-2; Or #1N461A; Sylvania Electric Products Inc.	CR1,CR3 - CR14, CR16 - CR34	256
32613			2				2	Diode, Silicon, Zener, 6.2 V, 400 MW, #1N753A; Motorola Semiconductor Div.	CR2,CR15	257
										258
										259
32705			2				2	Transistor, Silicon, #2N3646; Fairchild Semiconductor Div	Q1,Q13	260
32674			21				21	Transistor, Silicon, #3N84; General Electric Corp	Q2 Thru Q11, Q14 Thru Q24	261
32728			2				2	Transistor. Silicon, #2N3709, Texas Instruments	Q12, Q25	262
										263
										264
30071			1				1	Resistor, Fixed, Comp; 470 Ohms, 1/4 w, ±10%; Type GBT, IRC	R1	265
30086			1				1	Resistor, Fixed, Comp; 150K, 1/4w, ±10%; Type GBT, IRC	R2	266
30077			18				#	Resistor, Fixed, Comp; 4.7K, 1/4 w, ±10%; Type GBT, IRC	R3,R36,R39,R72, R73,R74,R75,R79,	267
									R82,R7,R10,R13, R16,R19,R22,R25,R28,R31	
30073			1				1	Resistor, Fixed, Comp; 1.5K, 1/4 w, ±10%; Type GBT, IRC	R4	268
30074			22				#	Resistor, Fixed, Comp; 2.2K, 1/4 w, ±10%; Type GBT, IRC	R5,R8,R11,R14, R17,R20,R23,R26,	269
									R29,R32,R40,R43, R46,R49,R52,R55,	
									R58,R61,R63,R66, R69,R71	
30072			20				#	Resistor, Fixed, Comp; 1K, 1/4 w, ±10%, Type GBT, IRC	R6,R9,R12,R15, R18,R21,R24,R27,	270
									R30,R33,R41,R44, R47,R50,R53,R56,	
									R59,R62,R67,R70	

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TP-510-3 **

PARTS LIST

ATLANTIC RESEARCH CORPORATION

TELEPRODUCTS DIVISION — ALEXANDRIA, VIRGINIA

PARTS LIST NO. 614
SHEET 2 OF ____ SHEETS

	APPROVED	DATE
PROJ ENG	A Gannon	8-4-67
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PREPARED	[illegible]	7/31/67

SUBJECT: TEST MESSAGE GENERATOR TMG-3

UNLESS OTHERWISE SPECIFIED ALL REFERENCES TO COMMERCIAL TYPES, STYLES, TRADE NAMES, AND CATALOGS ARE INTENDED TO BE DESCRIPTIVE AND NOT RESTRICTIVE AND ONLY TO INDICATE THE CHARACTERISTICS OF SATISFACTORY ARTICLES.

DWG. NO., PART NO., OR OTHER IDENTIFICATION	GROUP NO. AND QUANTITY 1	2	3	4	5	6	TOTAL PIECES OR QUANTITY	NOMENCLATURE	REF. DESIG.	ITEM NO.
30078			15				#	Resistor, Fixed, Comp; 10K, 1/4 w, ±10%; Type GBT, IRC	R34,R38,R42,R45, R48,R51,R54,R57, R60,R65,R68,R76, R77,R78,R81	271
30083			1				1	Resistor, Fixed, Comp; 27K, 1/4 w, ±10%; Type GBT, IRC	R35	272
30085			1				#	Resistor, Fixed, Comp; 100K, 1/4 w, ±10%; Type GBT, IRC	R80	273
30087			2				2	Resistor, Fixed, Comp; 5.1K, 1/4 w, ±5%, Type GBT, IRC	R37,R64	274
										275
										276
										277
										278
										279
33119			1				#	Test Point, Vertical, Brown; #105-858, E.F Johnson Co	J1	280
33120			1				#	Test Point, Vertical, Red, #105-852, E.F Johnson Co	J2	281
										282
										283
										284
										285
										286
										287
										288
										289
										290
								BULK MATERIALS, ETC		
							As Req'd	Cord, Lacing, Nylon, Flat Braided, .090, 3/32 Width, MW Finish, 50 Lb. Strength, Spec MIL-T-713 A, Class II, Type P; Alpha Wire Corp		291
							As Req'd	Solder, Alloy, 35/61 ST/35 SL; #44, Kester Solder Co		292
							As Req'd	Wire, Copper, Solid, Tinned, #22 AWG,		293
							As Req'd	Insulation, Tubing, Teflon, No. 20, Grade TW, #TFT-200-20, Alpha Wire Corp		294
							As Req'd	Wire, Copper, Stranded, Tinned, Color As Required, Vinyl Thermoplastic Insulation, #22 AWG-- 7/30		295
								Conductor Strand, .049 Nominal O.D , 600V Rating, Alpha Wire Corp		
							As Req'd	Epoxy, #MB3X, Barco Bond		296
							As Req'd	Tape, Adhesive, #495 Or Equiv.; Minnesota Mining & Mfg Co		297
										298
										299
										300
										301
										302

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TELEPRODUCTS DIVISION — ALEXANDRIA, VIRGINIA

PARTS LIST NO. 614
SHEET 10 OF ____ SHEETS

APPROVED		DATE
PROJ ENG		
CHECKED	[illegible]	8/4/67
PREPARED	[illegible]	7/20/67

SUBJECT: TEST MESSAGE GENERATOR TMG-3 — ADDENDUM SHEET TMG-3-1

UNLESS OTHERWISE SPECIFIED ALL REFERENCES TO COMMERCIAL TYPES, STYLES, TRADE NAMES, AND CATALOGS ARE INTENDED TO BE DESCRIPTIVE AND NOT RESTRICTIVE AND ONLY TO INDICATE THE CHARACTERISTICS OF SATISFACTORY ARTICLES.

DWG. NO., PART NO., OR OTHER IDENTIFICATION	GROUP NO. AND QUANTITY 1	2	3	4	5	6	TOTAL PIECES OR QUANTITY	NOMENCLATURE	REF. DESIG.	ITEM NO.
TP-DA-21731614			1				1	Bracket, Connector Mounting		1
				2			2	Fastener, Self-Clinching, #CL-440-2; Penn Engr. and Mfg. Co.		2
			1				1	Connector, BNC, #UG-1094/U; Amphenol-Borg Electronics Corp.	J2	3
				1			1	Washer, Shoulder, Nylon, #5607-32; Seastrom Mfg. Co. Inc.		4
										5
33074			1				1	Lug, Solder, #1415-4; H. H. Smith, Inc.		6
				1			1	Screw, Mach, Pan Hd, SS, #4-40NC-2 x 1/8 Lg.		7

#Pieces marked as such appear more than once. PIECE TOTAL AMOUNT IS SHOWN ON FIRST LISTING.

PARTS LIST

ATLANTIC RESEARCH CORPORATION

TELEPRODUCTS DIVISION ALEXANDRIA, VIRGINIA

PARTS LIST NO. 614
SHEET 11 OF ____ SHEETS

	APPROVED	DATE
PROJ ENG		
CHECKED	[illegible]	6/19/67
PREPARED	[illegible]	11-1-67

SUBJECT: TEST MESSAGE GENERATOR TMG-3

ADDENDUM SHEET TMG-3-2

UNLESS OTHERWISE SPECIFIED ALL REFERENCES TO COMMERCIAL TYPES, STYLES, TRADE NAMES, AND CATALOGS ARE INTENDED TO BE DESCRIPTIVE AND NOT RESTRICTIVE AND ONLY TO INDICATE THE CHARACTERISTICS OF SATISFACTORY ARTICLES.

DWG. NO., PART NO., OR OTHER IDENTIFICATION	GROUP NO. AND QUANTITY 1	2	3	4	5	6	TOTAL PIECES OR QUANTITY	NOMENCLATURE	REF. DESIG.	ITEM NO.
TP-DA-21731614			1				1	Bracket, Connector Mounting		1
				2			2	Fastener, Self-Clinching, #CL-440-2, Penn Engr and Mfg Co		2
			1				1	Connector, BNC, #UG-1094/U, Amphenol-Borg Electronics Corp	J2	3
				1			1	Washer, Shoulder, Nylon, #5607-32, Seastrom Mfg. Co Inc		4
										5
33074			1				1	Lug, Solder, #1415-4, H. H Smith, Inc		6
				1			1	Screw, Mach, Pan Hd, SS, #4-40NC-2 x 1/8 Lg		7
										8
										9
TP-AD-31169489 (Sht 1)							REF	Switch, Rotary, Assembly S1		10
30017			1				1	Resistor, Fixed, WW, 20,930 Ohms, 0.1 W, 0.1 %, #MAW-01, Marstan Electronic Corp	R100	11
30211			1				1	Resistor, Fixed, WW, 27,699 Ohms, 0.1 w, 0.1%; #MAW-01, Marstan Electronic Corp	R101	12
30210			1				1	Resistor, Fixed, WW, 25,194 Ohms, 0.1 w, 0.1%, #MAW-01; Marstan Electronic Corp,	R102	13
30209			1				1	Resistor, Fixed, WW, 22,103 Ohms, 0.1w, 0.1%; #MAW-01; Marstan Electronic Corp	R103	14
30206			1				1	Resistor, Fixed, WW, 16,856 Ohms, 0.1 w, 0.1%; #MAW-01; Marstan Electronic Corp	R104	15
30204			1				1	Resistor, Fixed, WW, 11,262 Ohms, 0.1 w, 0.1%; #MAW-01, Marstan Electronic Corp	R105	16

#Pieces marked as such appear more than once. PIECE TOTAL AMOUNT IS SHOWN ON FIRST LISTING.

TP-DA-0 * 66

PARTS LIST

ATLANTIC RESEARCH CORPORATION

TELEPRODUCTS DIVISION ALEXANDRIA, VIRGINIA

PARTS LIST NO. 614
SHEET 12 OF _____ SHEETS

APPROVED		DATE
PROJ EN		
CHECKED	[illegible]	8/19/57
PREPARED	[illegible]	7/30/57

SUBJECT: TEST MESSAGE GENERATOR TMG-3

ADDENDUM SHEET

TMG-3-3

UNLESS OTHERWISE SPECIFIED ALL REFERENCES TO COMMERCIAL TYPES, STYLES, TRADE NAMES, AND CATALOGS ARE INTENDED TO BE DESCRIPTIVE AND NOT RESTRICTIVE AND ONLY TO INDICATE THE CHARACTERISTICS OF SATISFACTORY ARTICLES.

DWG. NO., PART NO., OR OTHER IDENTIFICATION	GROUP NO. AND QUANTITY 1	2	3	4	5	6	TOTAL PIECES OR QUANTITY	NOMENCLATURE	REF. DESIG.	ITEM NO.
TP-DA-21731614			1				1	Bracket, Connector Mounting		1
				2			2	Fastener, Self-Clinching, #CL-440-2; Penn Engr. And Mfg. Co.		2
			1				1	Connector, BNC, #UG-1094/U; Amphenol-Borg Electronics Corp.	J2	3
				1			1	Washer, Shoulder, Nylon, #5607-32# Seastrom Mfg. Co., Inc.		4
										5
30074			1				1	Lug, Solder, #1415-4; H. H. Smith, Inc.		6
				1			1	Screw, Mach, Pan Hd, SS, #4-40NC-2 x 1/8 Lg.		7
										8
										9
TP-AD-31169489 (Sht 2)							REF	Switch, Rotary, Assembly, S1		10
30017			1				1	Resistor, Fixed, WW, 20,930 Ohms, 0.1 w, 0.1%; #MAW-01; Marstan Electronic Corp.	R100	11
30212			1				1	Resistor, Fixed, WW, 31,602 Ohms, 0.1 w, 0.1%; #MAW-01, Marstan Electronic Corp.	R101	12
30211			1				1	Resistor, Fixed, WW; 27,699 Ohms, 0.1 w, 0.1%; #MAW-01; Marstan Electronic Corp.	R102	13
30210			1				1	Resistor, Fixed, WW, 25,194 Ohms, 0.1 w, 0.1%; #MAW-01; Marstan Electronic Corp.	R103	14
30209			1				1	Resistor, Fixed, WW, 22,103 Ohms, 0.1 w, 0.1%; #MAW-01, Marstan Electronic Corp	R104	15
30206			1				1	Resistor, Fixed, WW, 16,856 Ohms, 0.1 w, 0.1%; #MAW-01; Marstan Electronic Corp.	R105	16
30204			1				1	Resistor, Fixed, WW, 11,262 Ohms, 0.1 w, 0.1%; #MAW-01; Marstan Electronic Corp.	R106	17

#Pieces marked as such appear more than once. PIECE TOTAL AMOUNT IS SHOWN ON FIRST LISTING.

TP-01. 7-57

PARTS LIST

ATLANTIC RESEARCH CORPORATION

TELEPRODUCTS DIVISION — ALEXANDRIA, VIRGINIA

PARTS LIST NO. 614
SHEET 13 OF ____ SHEETS

	APPROVED	DATE
PROJ. ENG		
CHECKED	E&D	8/9/67
PREPARED	E&D	7/30/67

SUBJECT: TEST MESSAGE GENERATOR TMG-3

ADDENDUM SHEET TMG-3-4

UNLESS OTHERWISE SPECIFIED ALL REFERENCES TO COMMERCIAL TYPES, STYLES, TRADE NAMES, AND CATALOGS ARE INTENDED TO BE DESCRIPTIVE AND NOT RESTRICTIVE AND ONLY TO INDICATE THE CHARACTERISTICS OF SATISFACTORY ARTICLES.

DWG. NO., PART NO., OR OTHER IDENTIFICATION	GROUP NO. AND QUANTITY 1	2	3	4	5	6	TOTAL PIECES OR QUANTITY	NOMENCLATURE	REF. DESIG.	ITEM NO.
TP-DA-21731614			1				1	Bracket, Connector Mounting		1
				2			2	Fastener, Self-Clinching, #CL-440-2, Penn Engr and Mfg Co		2
			1				1	Connector BNC UG 1094 U, Amphenol-Borg Electronics Corp	J2	3
				1			1	Washer Shoulder Nylon 5607 32 Senstron Mfg Co Inc		4
										5
30074			1				1	Lug, Solder, #1415-4, H. H. Smith, Inc		6
				1			1	Screw, Mach, Pan Hd SS, #4-40NC-2 x 1/8 Lg		7
										8
										9
TP-AD-31169489 Sht 3							REF	Switch, Rotary, Assembly, S1		10
30017			1				1	Resistor, Fixed, WW, 20,930 Ohms, 0.1 w, 0.1%, #MAW-01, Marston Electronic Corp	R100	11
30211			1				1	Resistor, Fixed, WW, 27,699 Ohms, 0.1 w, 0.1%, #MAW-01, Marston Electronic Corp	R101	12
30209			1				1	Resistor, Fixed, WW, 22,103 Ohms, 0.1 w, 0.1%, #MAW-01, Marston Electronic Corp	R102	13
30208			1				1	Resistor, Fixed, WW, 18,827 Ohms, 0.1 w, 0.1%, #MAW-01, Marston Electronic Corp	R103	14
30206			1				1	Resistor, Fixed, WW, 16,856 Ohms, 0.1 w, 0.1%, #MAW-01, Marston Electronic Corp	R104	15
30203			1				1	Resistor, Fixed, WW, 9,112 Ohms, 0.1 w, 0.1%, #MAW-01, Marston Electronic Corp	R105	16

#Pieces marked as such appear more than once. PIECE TOTAL AMOUNT IS SHOWN ON FIRST LISTING.

PARTS LIST

ATLANTIC RESEARCH CORPORATION

TELEPRODUCTS DIVISION — ALEXANDRIA, VIRGINIA

PARTS LIST NO. 614
SHEET 14 OF ____ SHEETS

APPROVED		DATE
PROJ. ENG		
CHECKED	[illegible]	8/19/67
PREPARED	[illegible]	7/31/67

SUBJECT: TEST MESSAGE GENERATOR TMG-3

ADDENDUM SHEET TMG-3-5

UNLESS OTHERWISE SPECIFIED ALL REFERENCES TO COMMERCIAL TYPES, STYLES, TRADE NAMES, AND CATALOGS ARE INTENDED TO BE DESCRIPTIVE AND NOT RESTRICTIVE AND ONLY TO INDICATE THE CHARACTERISTICS OF SATISFACTORY ARTICLES.

DWG. NO., PART NO., OR OTHER IDENTIFICATION	GROUP NO. AND QUANTITY 1	2	3	4	5	6	TOTAL PIECES OR QUANTITY	NOMENCLATURE	REF. DESIG.	ITEM NO.
TP-DA-21731614			1				1	Bracket, Connector Mounting		1
				2			2	Fastener, Self-Clinching, #CL-440-2; Penn Engr. and Mfg. Co.		2
			1				1	Connector, BNC, #UG-1094/U; Amphenol-Borg Electronics Corp.	J2	3
				1			1	Washer, Shoulder, Nylon, #5607-32; Seastrom Mfg. Co., Inc		4
										5
			1				1	Lug, Solder, #1415-4; H. H. Smith Inc.		6
				1			1	Screw, Mach, Pan Hd, SS, #4-40NC-2 x 1/8 lg.		7
										8
										9
TP-AD-31169489 (Sht 4)							REF	Switch, Rotary, Assembly, S1		10
30017			1				1	Resistor, Fixed, WW, 20,930 Ohms, 0.1 w, 0.1%; #MAW-01; Marstan Electronic Corp	R100	11
30211			1				1	Resistor, Fixed, WW, 27,699 Ohms, 0.1 w, 0.1%; #MAW-01; Marstan Electronic Corp.	R101	12
30208			1				1	Resistor, Fixed, WW, 18,827 Ohms, 0.1 w, 0.1%; #MAW-01, Marstan Electronic Corp	R102	13
30206			1				1	Resistor, Fixed, WW, 16,856 Ohms, 0.1w, 0.1%; #MAW-01; Marstan Electronic Corp.	R103	14
30204			1				1	Resistor, Fixed, WW, 11,262 Ohms, 0.1 w, 0.1%, #MAW-01, Marstan Electronic Corp.	R104	15

#Pieces marked as such appear more than once. PIECE TOTAL AMOUNT IS SHOWN ON FIRST LISTING.

PARTS LIST

ATLANTIC RESEARCH CORPORATION

TELEPRODUCTS DIVISION — ALEXANDRIA, VIRGINIA

PARTS LIST NO. 614
SHEET 15 OF ____ SHEETS

	APPROVED	DATE
PROJ. ENG		
CHECKED		
PREPARED		

SUBJECT: TEST MESSAGE GENERATOR TMG-3

ADDENDUM SHEET TMG-3-6

UNLESS OTHERWISE SPECIFIED ALL REFERENCES TO COMMERCIAL TYPES, STYLES, TRADE NAMES, AND CATALOGS ARE INTENDED TO BE DESCRIPTIVE AND NOT RESTRICTIVE AND ONLY TO INDICATE THE CHARACTERISTICS OF SATISFACTORY ARTICLES.

DWG. NO., PART NO., OR OTHER IDENTIFICATION	GROUP NO. AND QUANTITY 1	2	3	4	5	6	TOTAL PIECES OR QUANTITY	NOMENCLATURE	REF. DESIG.	ITEM NO.
TP-DA-21731614			1				1	Bracket, Connector Mounting		1
				2			2	Fastener, Self-Clinching, #CL-440-2, Penn Engr and Mfg Co		2
			1				1	Connector, BNC, #UG-1094 U, Amphenol-Borg Electronics Corp	J2	3
				1			1	Washer, Shoulder, Nylon, #5607-32; Seastrom Mfg Co Inc		4
										5
			1				1	Lug, Solder, #1415-4, H. H Smith Inc		6
				1			1	Screw, Mach, Pan Hd, SS, #4-40NC-2 x 1-8 Lg		7
										8
										9
TP-AD-311694##9 (Sht 5)							REF	Switch, Rotary, Assembly, S1		10
30017			1				1	Resistor, Fixed WW, 20,930 Ohms, 0.1 w, 0.1%, #MAW-01; Marston Electronic Corp	R100	11
30211			1				1	Resistor, Fixed, WW, 27,699 Ohms, 0.1 w, 0.1%, #MAW-01, Marston Electronic Corp	R101	12
30210			1				1	Resistor, Fixed, WW, 25,194 Ohms, 0.1 w, 0.1%; #MAW-01, Marston Electronic Corp	R102	13
30209			1				1	Resistor, Fixed, WW, 22,103 Ohms, 0.1 w, 0.1%, #MAW-01; Marston Electronic Corp	R103	14
30208			1				1	Resistor, Fixed, WW, 18,827 Ohms, 0.1 w, 0.1%; MAW-01, Marston Electronic Corp	R104	15
30206			1				1	Resistor, Fixed, WW, 16,856 Ohms, 0.1 w, 0.1%, #MAW-01, Marston Electronic Corp	R105	16
30204			1				1	Resistor, Fixed, WW, 11,262 Ohms, 0.1 w, 0.1%, #MAW-01, Marston Electronic Corp	R106	17
30203			1				1	Resistor, Fixed, WW, 9,112 Ohms, 0.1 w, 0.1%, #MAW-01, Marston Electronic Corp.	R107	18
30202			1				1	Resistor, Fixed, WW, 8,158 Ohms, 0.1 w, 0.1%, #MAW-01; Marston Electronic Corp	R108	19

#Pieces marked as such appear more than once. PIECE TOTAL AMOUNT IS SHOWN ON FIRST LISTING.

TP-0 10-7-58

PARTS LIST

ATLANTIC RESEARCH CORPORATION

TELEPRODUCTS DIVISION ALEXANDRIA, VIRGINIA

PARTS LIST NO. 614
SHEET 16 OF _____ SHEETS

APPROVED		DATE
PROJ. ENG.		
CHECKED	[illegible]	7/12/67
PREPARED	[illegible]	7/30/67

SUBJECT: TEST MESSAGE GENERATOR TMG-3

ADDENDUM SHEET

TMG-3-7

UNLESS OTHERWISE SPECIFIED ALL REFERENCES TO COMMERCIAL TYPES, STYLES, TRADE NAMES, AND CATALOGS ARE INTENDED TO BE DESCRIPTIVE AND NOT RESTRICTIVE AND ONLY TO INDICATE THE CHARACTERISTICS OF SATISFACTORY ARTICLES.

DWG. NO., PART NO., OR OTHER IDENTIFICATION	GROUP NO. AND QUANTITY 1	2	3	4	5	6	TOTAL PIECES OR QUANTITY	NOMENCLATURE	REF. DESIG.	ITEM NO.

PARTS LIST

ATLANTIC RESEARCH CORPORATION

TELEPRODUCTS DIVISION — ALEXANDRIA, VIRGINIA

PARTS LIST NO. 614
SHEET 17 OF ____ SHEETS

APPROVED		DATE
PROJ ENG		
CHECKED	[illegible]	8/4/67
PREPARED	[illegible]	7/30/67

SUBJECT: TEST MESSAGE GENERATOR TMG-3

ADDENDUM SHEET TMG-3-8

UNLESS OTHERWISE SPECIFIED ALL REFERENCES TO COMMERCIAL TYPES, STYLES, TRADE NAMES, AND CATALOGS ARE INTENDED TO BE DESCRIPTIVE AND NOT RESTRICTIVE AND ONLY TO INDICATE THE CHARACTERISTICS OF SATISFACTORY ARTICLES.

DWG. NO., PART NO., OR OTHER IDENTIFICATION	GROUP NO. AND QUANTITY 1	2	3	4	5	6	TOTAL PIECES OR QUANTITY	NOMENCLATURE	REF. DESIG.	ITEM NO.
TP-DA-21731614			1				1	Bracket, Connector Mounting		1
				2			2	Fastener, Self-Clinching, #CL-440-2; Penn Engr and Mfg. Co.		2
			1				1	Connector, BNC, #UG-1094 U; Amphenol-Borg Electronics Corp.	J2	3
				1			1	Washer, Shoulder, Nylon, #5607-32; Seastrom Mfg. Co., Inc.		4
										5
			1				1	Lug, Solder, #1415-4, H. H. Smith Inc.		6
				1			1	Screw, Mach, Pan Hd, SS; #4-40NC-2 x 1/8 Lg.		7
										8
										9
TP-AD-31169489 (Sht 6)							REF	Switch, Rotary, Assembly, S1		10
30017			1				1	Resistor, Fixed, WW, 20,930 Ohms, 0.1 w, 0.1%; #MAW-01, Marstan Electronic Corp	R100	11
30211			1				1	Resistor, Fixed, WW, 27,699 Ohms, 0.1 w, 0.1%; #MAW-01; Marstan Electronic Corp	R101	12
30210			1				1	Resistor, Fixed, WW, 25,194 Ohms, 0.1 w, 0.1%; #MAW-01, Marstan Electronic Corp	R102	13
30209			1				1	Resistor, Fixed, WW, 22,103 Ohms, 0.1 w, 0.1%; #MAW-01, Marstan Electronic Corp.	R103	14
30208			1				1	Resistor, Fixed, WW, 18,827 Ohms, 0.1 w, 0.1%; #MAW-01; Marstan Electronic Corp.	R104	15
30206			1				1	Resistor, Fixed, WW, 16,856 Ohms, 0.1 w, 0.1%; #MAW-01; Marstan Electronic Corp	R105	16
30203			1				1	Resistor, Fixed, WW, 9,112 Ohms, 0.1 w, 0.1%; #MAW-01; Marstan Electronic Corp	R106	17
30202			1				1	Resistor, Fixed WW, 8,158 Ohms, 0.1 w, 0.1%, #MAW-01, Marston Electronic Corp	R107	18

#Pieces marked as such appear more than once. PIECE TOTAL AMOUNT IS SHOWN ON FIRST LISTING.

TP-610-7-66

PARTS LIST

ATLANTIC RESEARCH CORPORATION

TELEPRODUCTS DIVISION — ALEXANDRIA, VIRGINIA

PARTS LIST NO. 614
SHEET 18 OF _____ SHEETS

APPROVED	DATE
PROJ. ENG.	
CHECKED	8/19/67
PREPARED	7/30/67

SUBJECT: TEST MESSAGE GENERATOR TMG-3 — ADDENDUM SHEET TMG-3-9

UNLESS OTHERWISE SPECIFIED ALL REFERENCES TO COMMERCIAL TYPES, STYLES, TRADE NAMES, AND CATALOGS ARE INTENDED TO BE DESCRIPTIVE AND NOT RESTRICTIVE AND ONLY TO INDICATE THE CHARACTERISTICS OF SATISFACTORY ARTICLES.

DWG. NO., PART NO., OR OTHER IDENTIFICATION	GROUP NO. AND QUANTITY 1	2	3	4	5	6	TOTAL PIECES OR QUANTITY	NOMENCLATURE	REF. DESIG.	ITEM NO.
TP-DA-21731614			1				1	Bracket, Connector Mounting		1
				2			2	Fastener, Self-Clinching, #CL-440-2; Penn Engr. and Mfg. Co.		2
			1				1	Connector, BNC, #UG-1094/U; Amphenol-Borg Electronics Corp.	J2	3
				1			1	Washer, Shoulder, Nylon, #5607-32; Seastrom Mfg. Co., Inc.		4
										5
			1				1	Lug, Solder, #1415-4; H. H. Smith Inc.		6
				1			1	Screw, Mach, Pan Hd, SS; #4-40NC-2 x 1/8 Lg.		7
										8
										9
TP-AD-31169489 (Sht 7)							REF	Switch, Rotary, Assembly, S1		10
30017			1				1	Resistor, Fixed, WW, 20,930 Ohms, 0.1 w, 0.1%; #MAW-01; Marstan Electronic Corp	R100	11
30211			1				1	Resistor, Fixed, WW, 27,699 Ohms, 0.1 w, 0.1%; #MAW-01; Marstan Electronic Corp.	R101	12
30210			1				1	Resistor, Fixed, WW, 25,194 Ohms, 0.1 w, 0.1%; #MAW-01; Marstan Electronic Corp	R102	13

#Pieces marked as such appear more than once. PIECE TOTAL AMOUNT IS SHOWN ON FIRST LISTING.

PARTS LIST

ATLANTIC RESEARCH CORPORATION

TELEPRODUCTS DIVISION — ALEXANDRIA, VIRGINIA

PARTS LIST NO. 614
SHEET 19 OF ____ SHEETS

APPROVED		DATE
PROJ ENG.		
CHECKED	[illegible]	8/19/67
PREPARED	[illegible]	7/3/67

SUBJECT: TEST MESSAGE GENERATOR
TMG-3

ADDENDUM SHEET
TMG-3-10

UNLESS OTHERWISE SPECIFIED ALL REFERENCES TO COMMERCIAL TYPES, STYLES, TRADE NAMES, AND CATALOGS ARE INTENDED TO BE DESCRIPTIVE AND NOT RESTRICTIVE AND ONLY TO INDICATE THE CHARACTERISTICS OF SATISFACTORY ARTICLES.

DWG. NO., PART NO., OR OTHER IDENTIFICATION	GROUP NO. AND QUANTITY 1	2	3	4	5	6	TOTAL PIECES OR QUANTITY	NOMENCLATURE	REF. DESIG.	ITEM NO.
TP-DA-21731614			1				1	Bracket, Connector Mounting		1
				2			2	Fastener, Self-Clinching, #CL-440-2, Penn Engr. And Mfg. Co.		2
			1				1	Connector, BNC, #UG-1094/U, Amphenol-Borg Electronses Corp	J2	3
				1			1	Washer, Shoulder, Nylon, #5607-32; Seastrom Mfg. Co., Inc.		4
										5
			1				1	Lug, Solder, #1415-4, H. H. Smith Inc		6
				1			1	Screw, Mach, Pan Hd, SS; #4-40NC-2 x 1/8 Lg.		7
										8
										9
TP-AD-31169489 (Sht 8)							REF	Switch, Rotary, Assembly, S1		10
30017			1				1	Resistor, Fixed, WW, 20,930 Ohms, 0.1 w, 0.1%; #MAW-01; Marstan Electronic Corp.	R100	11
30208			1				1	Resistor, Fixed, WW, 18,827 Ohms, 0.1 w, 0.1%, #MAW-01; Marstan Electronic Corp	R101	12
30203			1				1	Resistor, Fixed, WW, 9,112 Ohms, 0.1 w, 0.1%; #MAW-01; Marstan Electronic Corp.	R102	13

#Pieces marked as such appear more than once. PIECE TOTAL AMOUNT IS SHOWN ON FIRST LISTING.

TP-010-7.00

PARTS LIST

ATLANTIC RESEARCH CORPORATION

TELEPRODUCTS DIVISION — ALEXANDRIA, VIRGINIA

PARTS LIST NO. 614
SHEET 20 OF ____ SHEETS

	APPROVED	DATE
PROJ ENG.	Abbiss	8-1-67
CHECKED		
PREPARED	[illegible]	[illegible]

SUBJECT: TEST MESSAGE GENERATOR TMG-3

ADDENDUM SHEET

TMG-3-11

UNLESS OTHERWISE SPECIFIED ALL REFERENCES TO COMMERCIAL TYPES, STYLES, TRADE NAMES, AND CATALOGS ARE INTENDED TO BE DESCRIPTIVE AND NOT RESTRICTIVE AND ONLY TO INDICATE THE CHARACTERISTICS OF SATISFACTORY ARTICLES.

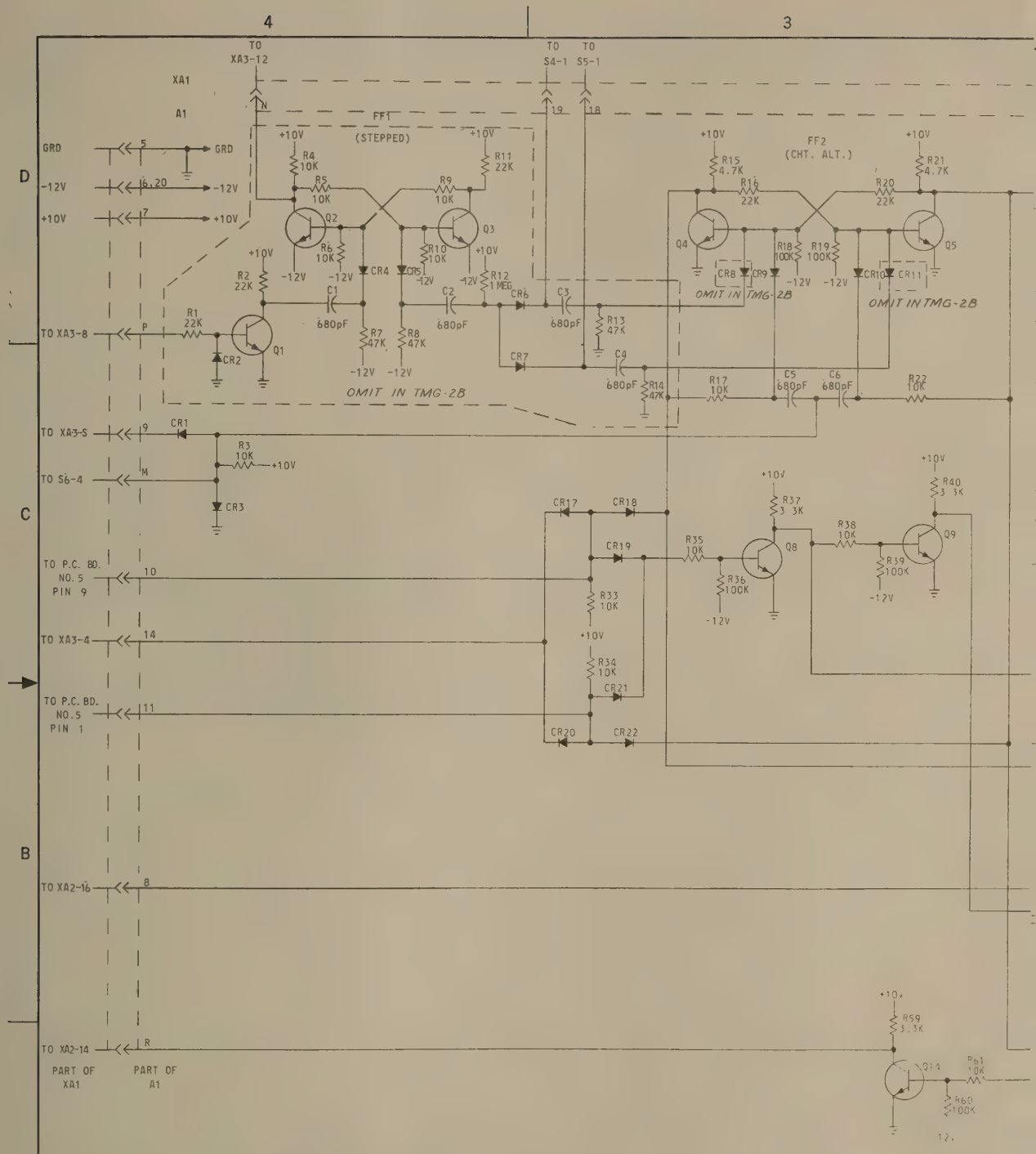
DWG. NO., PART NO., OR OTHER IDENTIFICATION	GROUP NO. AND QUANTITY 1	2	3	4	5	6	TOTAL PIECES OR QUANTITY	NOMENCLATURE	REF. DESIG.	ITEM NO.
TP-DA-21732614			1				1	Bracket, Connector Mounting		1
				2			2	Fastener, Self-Clinching, #CL-440-2; Penn Engr. and Mfg. Co.		2
			1				1	Connector, 6 Contact, #9A881071; Motorola Inc.	J2	3
33704			1				1	Lug, Solder, #1415-4; H. H. Smith Inc.		4
				1			1	Screw, Mach, Pan Hd, SS, #4-40NC-2 x 1/8 lg.		5
										6
										7
TP-AD-31169489 (Sht 9)							REF	Switch, Rotary, Assembly, S1		8
30211			1				1	Resistor, Fixed, WW, 27,699 Ohms, 0.1 W, 0.1%; #MAW-01; Marstan Electronic Corp.	R101	9
30210			1				1	Resistor, Fixed, WW, 25,194 Ohms, 0.1 w, 0.1%; #MAW-01; Marstan Electronic Corp.	R102	10
30209			1				1	Resistor, Fixed, WW, 22,103 Ohms, 0.1 w, 0.1%; #MAW-01; Marston Electronic Corp.	R103	11
30208			1				1	Resistor, Fixed, WW, 18,827 Ohms, 0.1 w, 0.1%; #MAW-01; Marston Electronic Corp.	R104	12
30206			1				1	Resistor, Fixed, WW, 16,856 Ohms, 0.1 w, 0.1%; #MAW-01, Marstan Electronic Corp.	R105	13
30204			1				1	Resistor, Fixed, WW, 11,262 Ohms, 0.1 w, 0.1%; #MAW-01, Marstan Electronic Corp.	R106	14
			1				1	Resistor, Fixed, WW, 9,149 Ohms, 0.1 w, 0.1%, #MAW-01; Marstan Electronic Corp.	R107	15
30203			1				1	Resistor, Fixed, WW, 9,112 Ohms, 0.1 w, 0.1%; #MAW-01; Marstan Electronic Corp.	R108	16
30202			1				1	Resistor, Fixed, WW, 8,158 Ohms, 0.1 w, 0.1%; #MAW-01; Marstan Electronic Corp.	R109	17
30017			1				1	Resistor, Fixed, WW, 20,930 Ohms, 0.1 w, 0.1%; #MAW-01; Marstan Electronic Corp.	R110	18

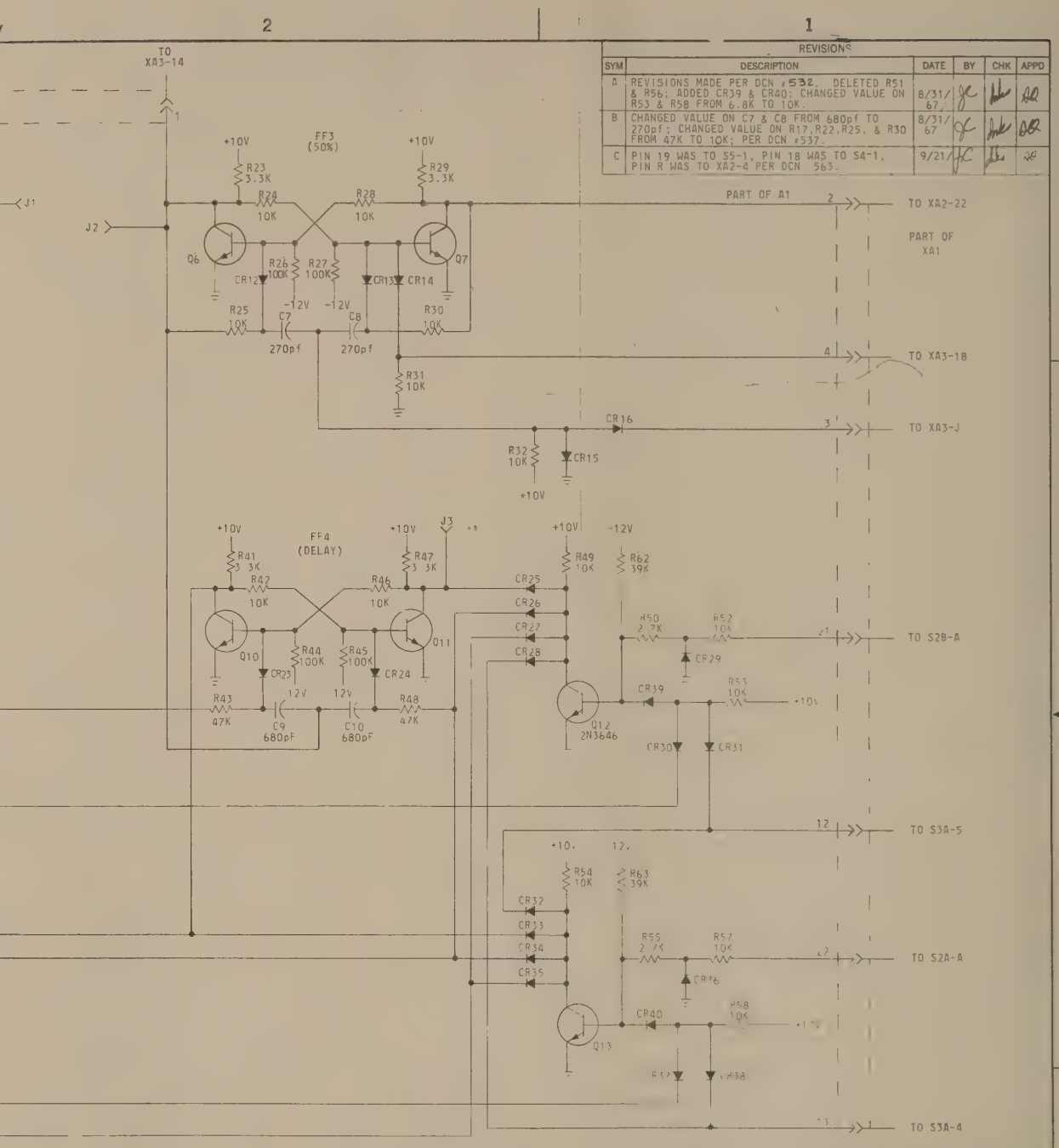
#Pieces marked as such appear more than once. PIECE TOTAL AMOUNT IS SHOWN ON FIRST LISTING.

TP-010 7-65

SECTION VII

DRAWINGS


4
3
TO XA3-12
TO S4-1
TO S5-1
XA1
A1
FF1 (STEPPED)
FF2 (CMT. ALT.)
GRD
-12V
+10V
TO XA3-8
TO XA3-S
TO S6-4
TO P.C. BD. NO. 5 PIN 9
TO XA3-4
TO P.C. BD. NO. 5 PIN 1
TO XA2-16
TO XA2-14
PART OF XA1
PART OF A1
OMIT IN TMG-2B
OMIT IN TMG-2B
OMIT IN TMG-2B
Q1
Q2
Q3
Q4
Q5
Q8
Q9
Q13
CR1
CR2
CR3
CR4
CR5
CR6
CR7
CR8
CR9
CR10
CR11
CR17
CR18
CR19
CR20
CR21
CR22
R1 22K
R2 22K
R3 10K
R4 10K
R5 10K
R6 10K
R7 47K
R8 47K
R9 10K
R10 10K
R11 22K
R12 1 MEG
R13 47K
R14 47K
R15 4.7K
R16 22K
R17 10K
R18 100K
R19 100K
R20 22K
R21 4.7K
R22 10K
R33 10K
R34 10K
R35 10K
R36 100K
R37 3.3K
R38 10K
R39 100K
R40 3.3K
R59 3.3K
R60 100K
Pot 10K
C1 680pF
C2 680pF
C3 680pF
C4 680pF
C5 680pF
C6 680pF
NOTES:
1. UNLESS OTHERWISE SPECIFIED:
A. ALL RESISTANCE VALUES ARE IN OHMS, 1/4 W, ±10%.
B. ALL CAPACITANCE VALUES ARE IN MICROFARADS.
C. ALL DIODES ARE 1N461A.
D. ALL TRANSISTORS ARE 2N3565.



REVISIONS

SYM	DESCRIPTION	DATE	BY	CHK	APPD
A	REVISIONS MADE PER DCN #532. DELETED R51 & R56; ADDED CR39 & CR40; CHANGED VALUE ON R53 & R58 FROM 6.8K TO 10K.	8/31/67	JC		
B	CHANGED VALUE ON C7 & C8 FROM 680pf TO 270pf; CHANGED VALUE ON R17, R22, R25, & R30 FROM 47K TO 10K; PER DCN #537.	8/31/67	JC		
C	PIN 19 WAS TO S5-1, PIN 18 WAS TO S4-1, PIN R WAS TO XA2-4 PER DCN 563.	9/21	JC		

QTY REQD	PART OR IDENTIFYING NO.	ITEM NO.	DESCRIPTION	REF DESIG	MANUFACTURER

LIST OF MATERIALS OR PARTS LIST

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES.
TOLERANCES:
ANGLES ±
FRACTIONS ±
2 PLACE DECIMALS ±
3 PLACE DECIMALS ±
SURFACE ROUGHNESS
DO NOT SCALE DRAWING
MATERIAL:

	BY	DATE
APPROVAL		
DRAWN		
CHECKED		
ENGRG		
PROJ ENGRG	A Quinton	7-31-67
STRESS		

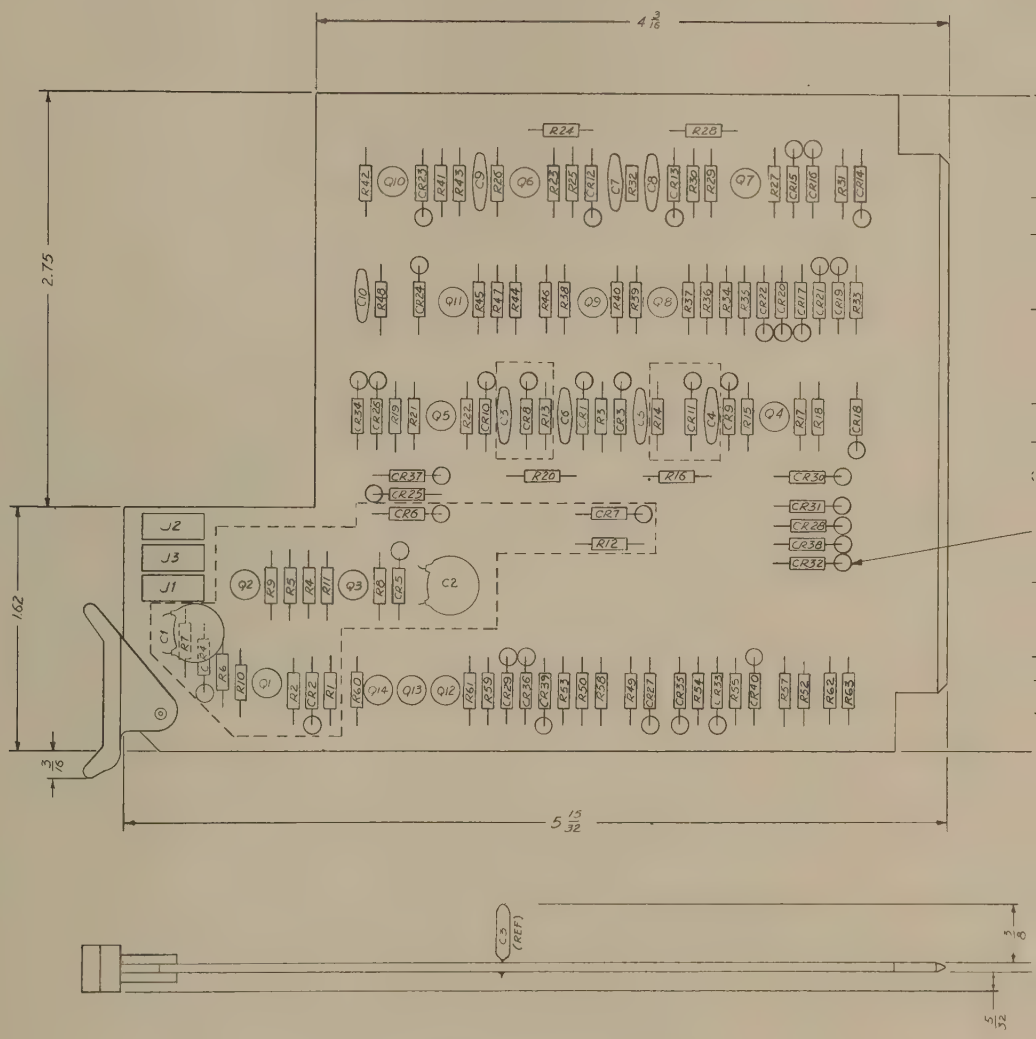
APPROVED FOR ATLANTIC RESEARCH _____ 19 _____ NAME DATE
APPROVED _____ 19 _____ NAME DATE

ATLANTIC RESEARCH CORPORATION
TELEPRODUCTS DIVISION
ALEXANDRIA, VIRGINIA

SCHEMATIC DIAGRAM
BOARD "I"
TMG-3

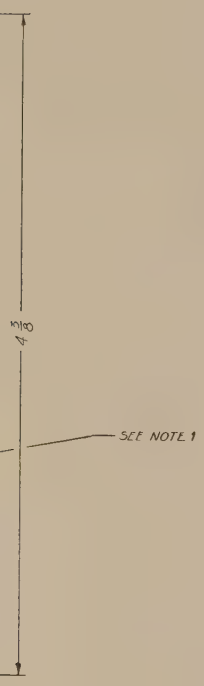
CODE IDENT NO.	SIZE		REV
95335	D	TP-SD-41515614	C LTR
SCALE			SHEET 1 OF 1

DASH NO.	NEXT ASSEMBLY	PROJECT
APPLICATION		



NOTES:
1. CIRCLE ◯ INDICATES CATHODE END OF DIODE.
2. ALL DIMENSIONS ARE REFERENCE
3. ALL COMPONENTS ENCLOSED BY BROKEN LINE SHOULD BE OMITTED ON TMG-2B MODEL.

REVISIONS					
SYM	DESCRIPTION	DATE	BY	CHK	APPD
A	CR39 WAS R51, CR40 WAS R56 PER DCN #561	9/21/67	INK	[illegible]	AQ



QTY REQD	PART OR IDENTIFYING NO.	ITEM NO.	DESCRIPTION	REF DESIG	MANUFACTURER
LIST OF MATERIALS OR PARTS LIST					

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES.
TOLERANCES:
ANGLES ±
FRACTIONS ±
2 PLACE DECIMALS ±
3 PLACE DECIMALS ±
SURFACE ROUGHNESS

DO NOT SCALE DRAWING

MATERIAL:

	BY	DATE
APPROVAL		
DRAWN	Jaya Comm	7-11-67
CHECKED	[illegible]	7/19/67
ENGRG		
PROJ ENGRG	A Quinn	8-1-67
STRESS		

APPROVED FOR ATLANTIC RESEARCH
NAME DATE 19
APPROVED
NAME DATE 19

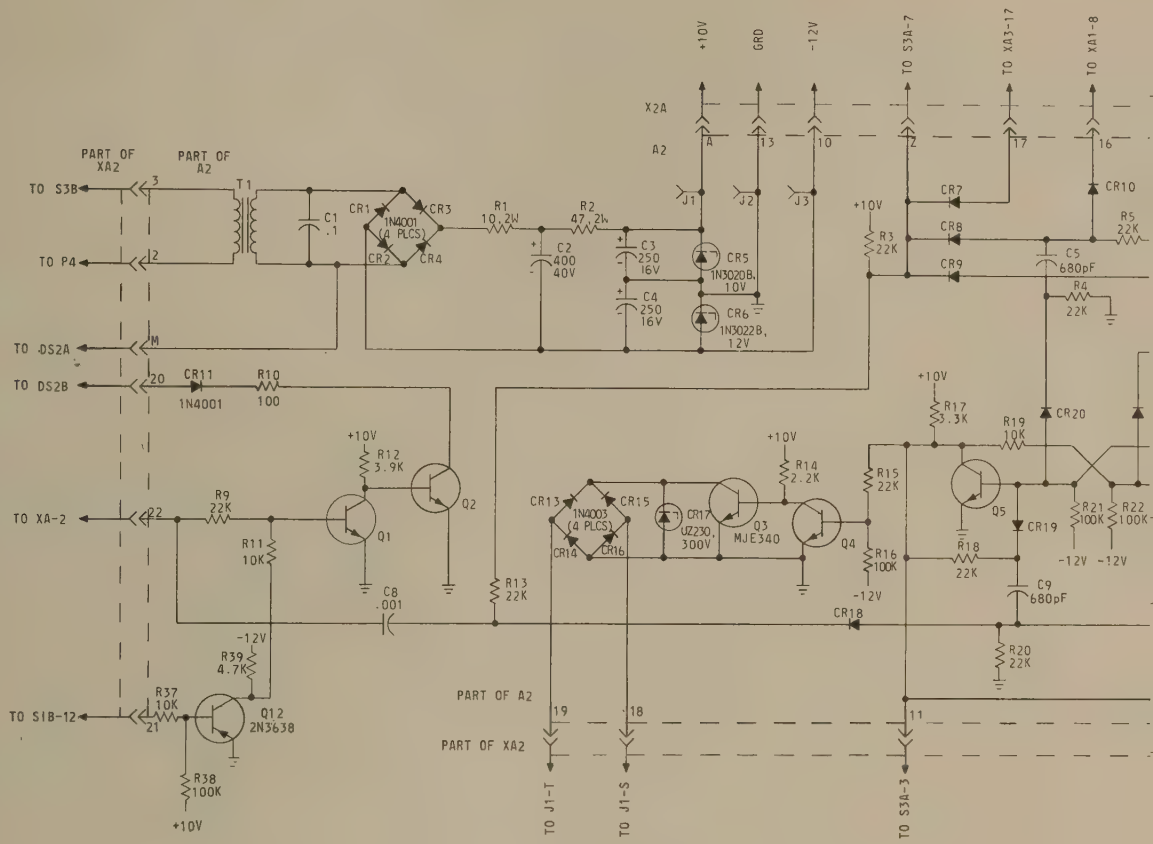
ATLANTIC RESEARCH CORPORATION
TELEPRODUCTS DIVISION
ALEXANDRIA, VIRGINIA

PRINTED CIRCUIT BOARD ASSEMBLY
BOARD 7"
TEST MESSAGE GENERATOR
TMG-3

DASH NO.	NEXT ASSEMBLY	PROJECT
–	TP-FA-41520614	TMG-28
–	TP-FA-41520614	TMG-3
APPLICATION		

CODE IDENT NO. 95335 | SIZE D | TP-AD-41523614 | REV A LTR

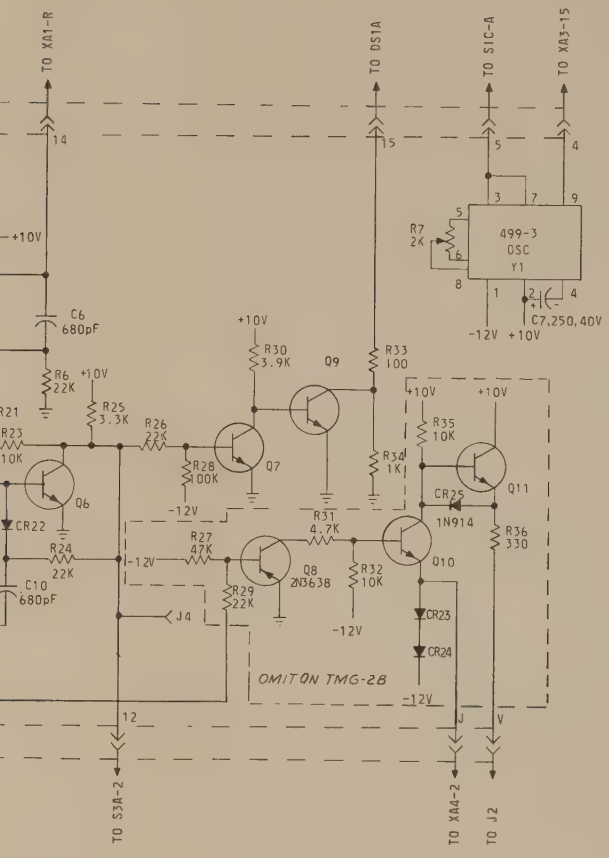
SCALE 2/1 | SHEET 1 OF 1



NOTES:

1. UNLESS OTHERWISE SPECIFIED:
   - A. ALL RESISTANCE VALUES ARE IN OHMS, 1/4 W, ±10%.
   - B. ALL CAPACITANCE VALUES ARE IN MICROFARADS.
   - C. ALL DIODES ARE 1N461A.
   - D. ALL TRANSISTORS ARE 2N3567.
2. IN THE TMG-3-11, THE EIA OUTPUT IS FED TO PIN 6 OF SPECIAL CONNECTOR J2.

REVISIONS					
SYM	DESCRIPTION	DATE	BY	CHK	APPD
A	REV. NOTE 1-D TO READ ALL ....2N3567, PER DCN #529	8/24/67	[illegible]	[illegible]	[illegible]
B	CHANGE CR25 FROM 1N461A TO 1N914 PER DCN #537.	8/31/67	[illegible]	[illegible]	[illegible]



QTY REQD	PART OR IDENTIFYING NO.	ITEM NO.	DESCRIPTION	REF DESIG	MANUFACTURER

LIST OF MATERIALS OR PARTS LIST

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES.
TOLERANCES:
ANGLES ±
FRACTIONS ±
2 PLACE DECIMALS ±
3 PLACE DECIMALS ±
SURFACE ROUGHNESS
DO NOT SCALE DRAWING
MATERIAL:

	BY	DATE
APPROVAL		
DRAWN	Joyce Crowe	6-26-67
CHECKED	[illegible]	7/6/67
ENGRG		
PROJ ENGRG	[illegible]	8-1-67
STRESS		

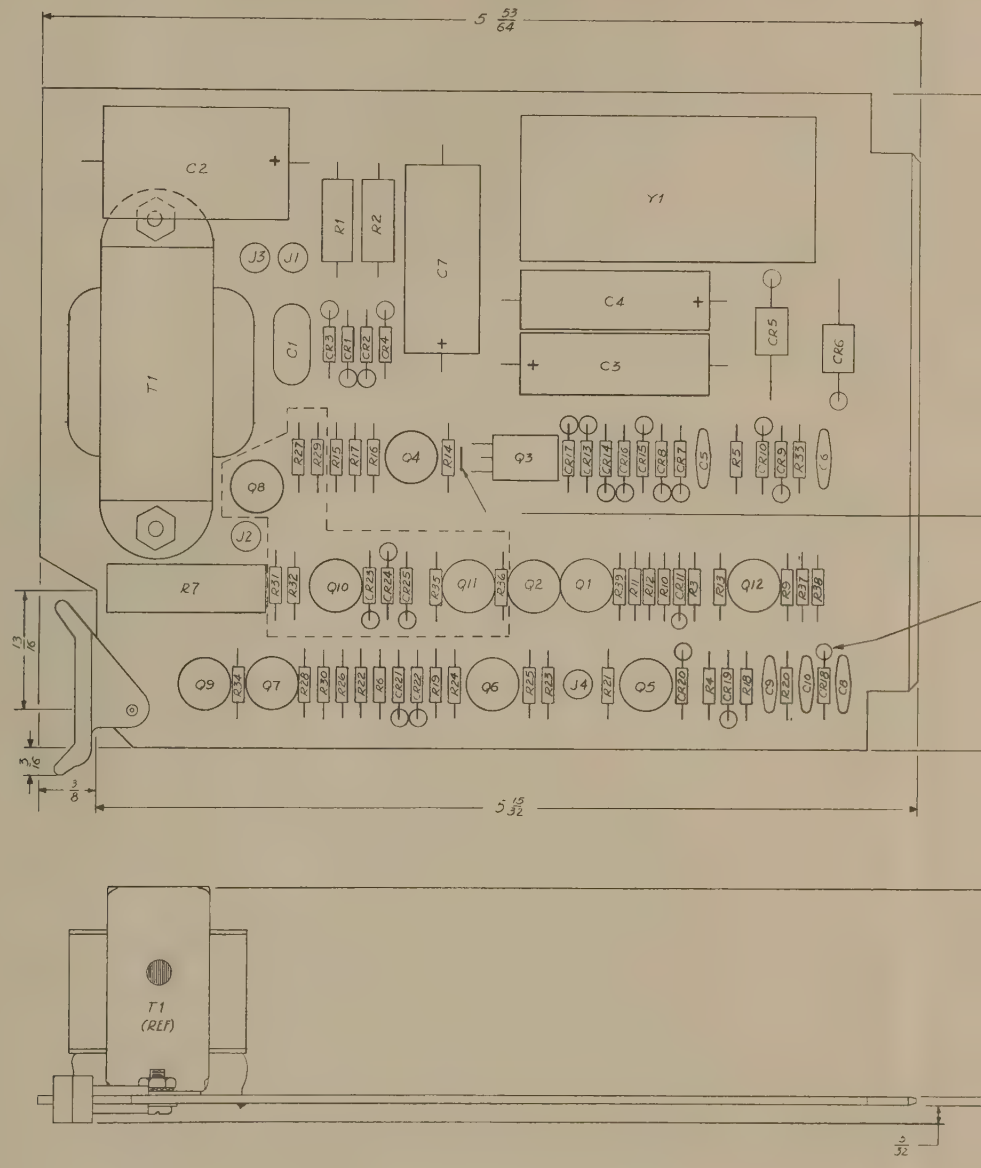
APPROVED FOR ATLANTIC RESEARCH
NAME DATE 19
APPROVED
NAME DATE 19

ATLANTIC RESEARCH CORPORATION
TELEPRODUCTS DIVISION
ALEXANDRIA, VIRGINIA

SCHEMATIC DIAGRAM
BOARD "2"
TMG-3

CODE IDENT NO.	SIZE		REV
95335	D	TP-SD-4151061 4	B LTR
SCALE			SHEET 1 OF 1

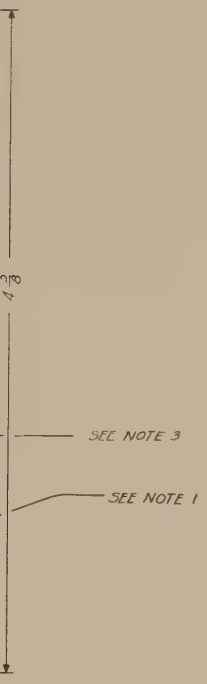
DASH NO.	NEXT ASSEMBLY	PROJECT
APPLICATION		



NOTES:

1. CIRCLE ○ INDICATES CATHODE END OF DIODE.
2. ALL DIMENSIONS ARE REFERENCE
3. THE METAL SIDE OF THE TRANSISTOR MUST FACE THE REFERENCE LINE ON THE P.C. BOARD
4. ALL COMPONENTS ENCLOSED BY BROKEN LINE SHOULD BE OMITTED FOR TMG-2B MODEL

REVISIONS					
SYM	DESCRIPTION	DATE	BY	CHK	APPD



QTY REQD	PART OR IDENTIFYING NO.	ITEM NO.	DESCRIPTION	REF DESIG	MANUFACTURER

LIST OF MATERIALS OR PARTS LIST

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES.
TOLERANCES: ~
ANGLES ± ~
FRACTIONS ± ~
2 PLACE DECIMALS ± ~
3 PLACE DECIMALS ± ~
SURFACE ROUGHNESS 4

DO NOT SCALE DRAWING

MATERIAL: ~

APPROVAL	BY	DATE
DRAWN	Joyce Connor	7-10-67
CHECKED	Ed Pike	7/19/67
ENGRG		
PROJ ENGRG	Approved	8-1-67
STRESS		

APPROVED FOR ATLANTIC RESEARCH
NAME _____ DATE _____ 19__

APPROVED
NAME _____ DATE _____ 19__

ATLANTIC RESEARCH CORPORATION
TELEPRODUCTS DIVISION
ALEXANDRIA, VIRGINIA

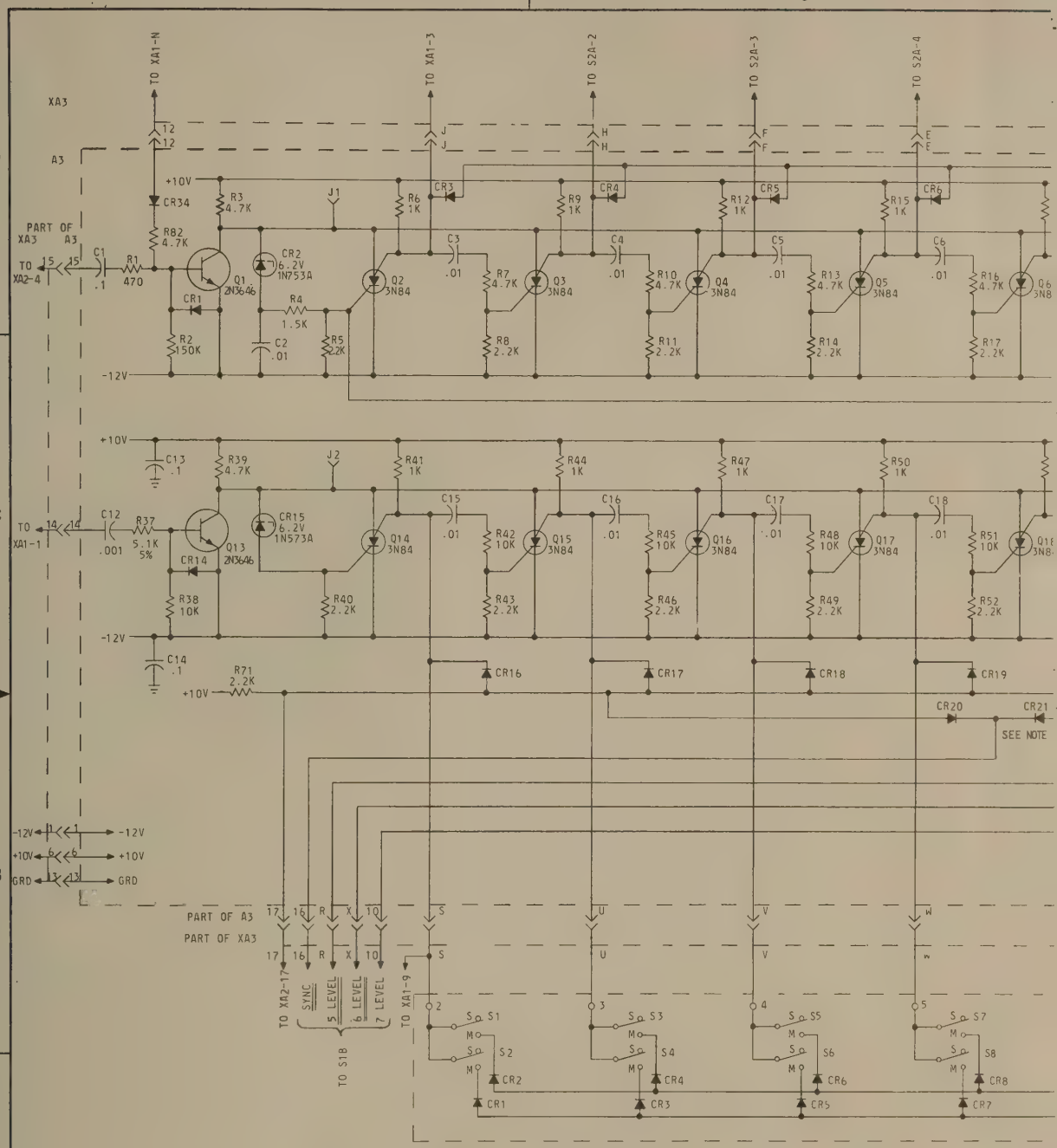
PRINTED CIRCUIT BOARD ASSEMBLY
BOARD "2"
TEST MESSAGE GENERATOR
TMG-3

CODE IDENT NO.	SIZE		REV
95335	D	TP-AD-41521614	– LTR

SCALE 2/1 SHEET 1 OF 1

DASH NO.	NEXT ASSEMBLY	PROJECT
—	TP FA 41520614	TMG 2B
—	TP-FA-41520614	TMG-3

APPLICATION

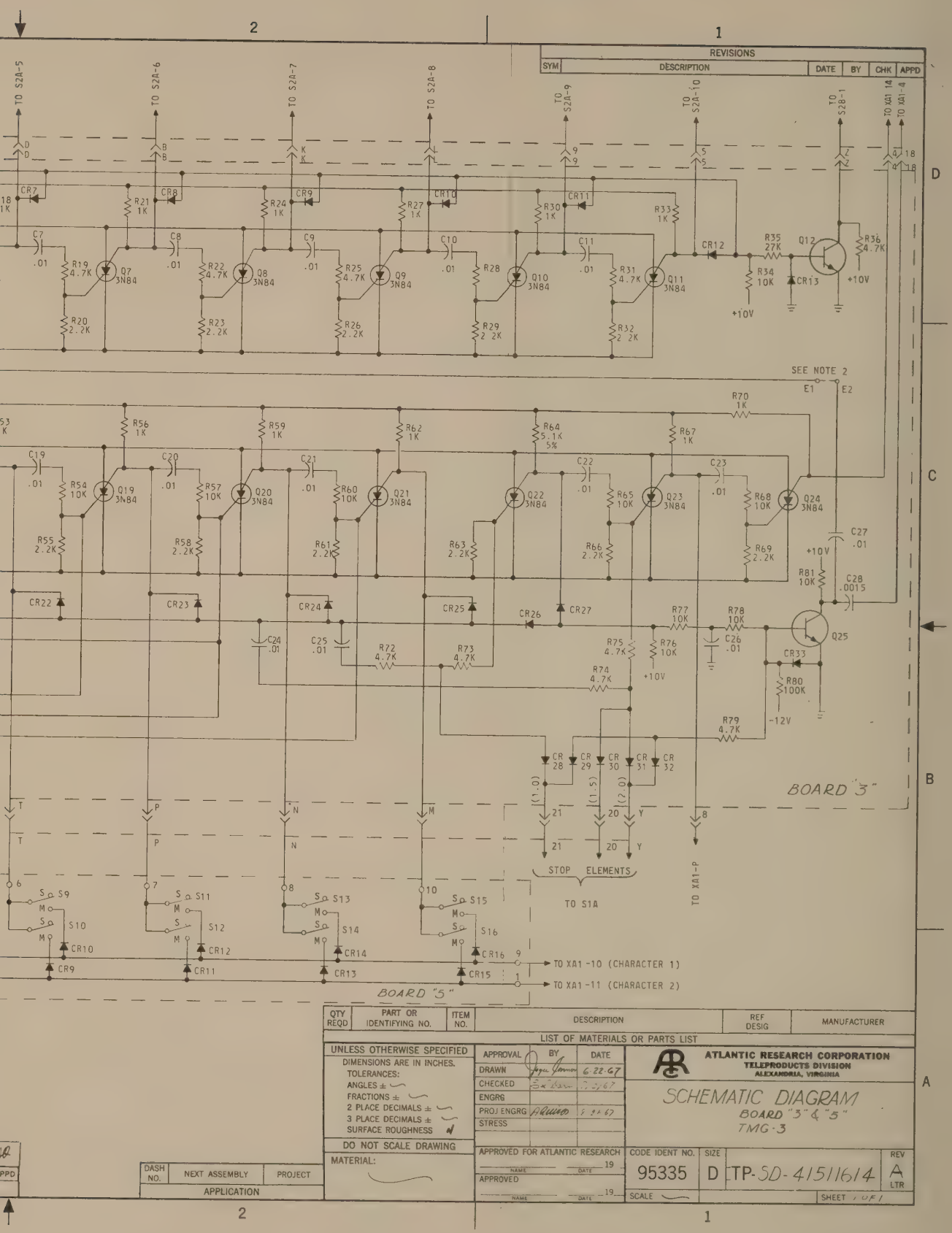


NOTES:

1. UNLESS OTHERWISE SPECIFIED:
   - A. ALL RESISTANCE VALUES ARE IN OHMS, 1/4 W, ±10%.
   - B. ALL CAPACITANCE VALUES ARE IN MICROFARDS.
   - C. ALL DIODES ARE 1N461A.
   - D. ALL TRANSISTORS ARE 2N3709
2. PUT A STRAP IN TO PRODUCE A 1.45 STOP ELEMENT IN PLACE OF A 1.5 STOP ELEMENT.
3. FOR B LEVEL SYNC DELETE CR21.

SYM	DESCRIPTION	DATE	BY	CHK
A	NOTE 1-D WAS TRANSISTOR 2N3565 PER DCN #529	8/22/67	E.V.	

REVISIONS



QTY REQD	PART OR IDENTIFYING NO.	ITEM NO.	DESCRIPTION	REF DESIG	MANUFACTURER

LIST OF MATERIALS OR PARTS LIST

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES.
TOLERANCES:
ANGLES ±
FRACTIONS ±
2 PLACE DECIMALS ±
3 PLACE DECIMALS ±
SURFACE ROUGHNESS

DO NOT SCALE DRAWING

MATERIAL:

APPROVAL	BY	DATE
DRAWN	Joyce Jones	6-22-67
CHECKED	Ed Klein	6-26-67
ENGRG		
PROJ ENGRG	A Russo	6 30 67
STRESS		

APPROVED FOR ATLANTIC RESEARCH _____ NAME _____ DATE 19

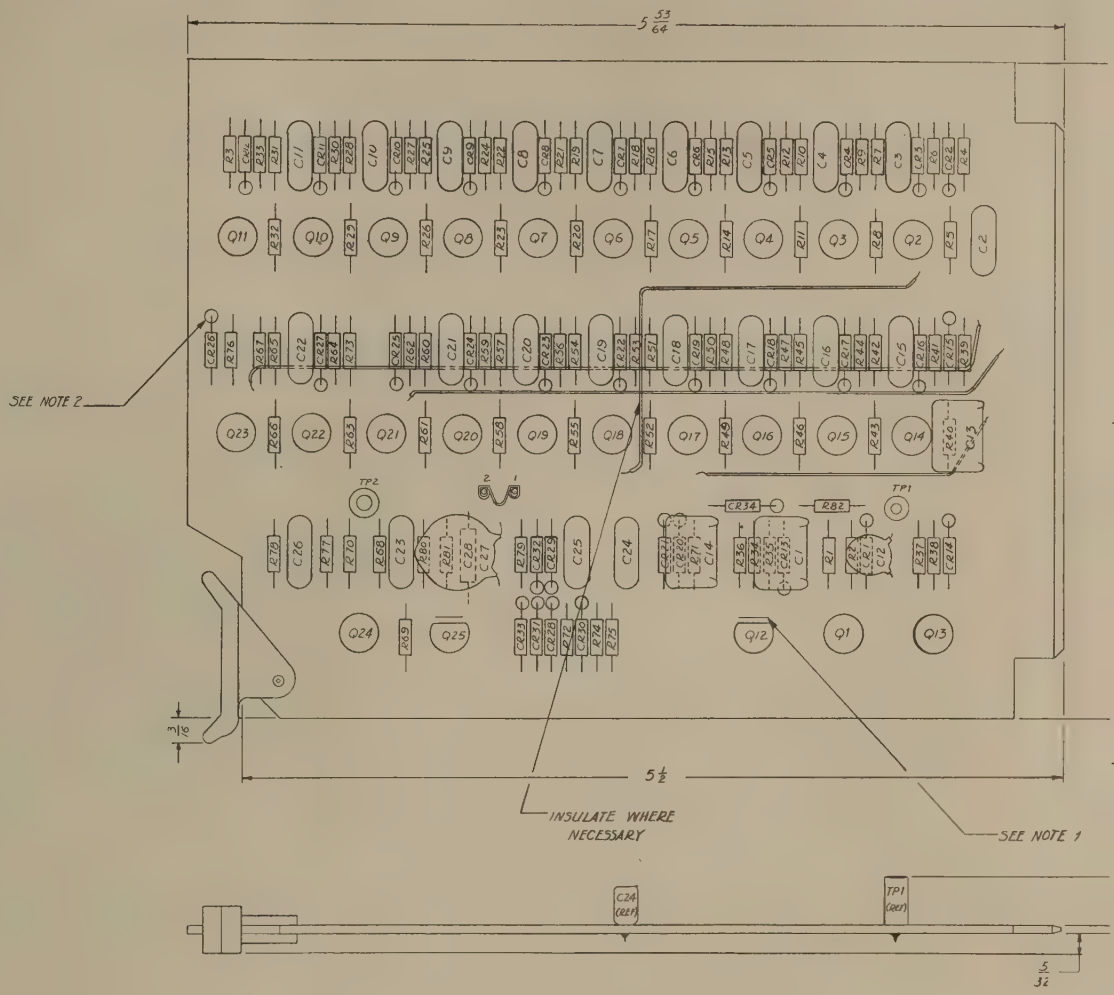
APPROVED _____ NAME _____ DATE 19

ATLANTIC RESEARCH CORPORATION
TELEPRODUCTS DIVISION
ALEXANDRIA, VIRGINIA

SCHEMATIC DIAGRAM
BOARD "3" & "5"
TMG-3

DASH NO.	NEXT ASSEMBLY	PROJECT
APPLICATION		

CODE IDENT NO.	SIZE		REV
95335	D	TP-SD-41511614	A LTR
SCALE			SHEET 1 OF 1



NOTES:

1. LINE —— INDICATES FLAT SIDE OF TRANSISTOR.
2. CIRCLE ○ INDICATES CATHODE END OF DIODE
3. ALL DIMENSIONS ARE REFERENCE.

REVISIONS					
SYM	DESCRIPTION	DATE	BY	CHK	APPD
A	CAPACITORS C3-C11 WERE ILLUSTRATED AS CERAMIC DISCS, PER DCN # 568	9/27/67	EVL	[illegible]	[illegible]

QTY REQD	PART OR IDENTIFYING NO.	ITEM NO.	DESCRIPTION	REF DESIG	MANUFACTURER

LIST OF MATERIALS OR PARTS LIST

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES.
TOLERANCES:
ANGLES ±
FRACTIONS ±
2 PLACE DECIMALS ±
3 PLACE DECIMALS ±
SURFACE ROUGHNESS
DO NOT SCALE DRAWING
MATERIAL:

APPROVAL	BY	DATE
DRAWN	Joyce Conner	7-5-67
CHECKED	Ed Soto	7/6/67
ENGRG		
PROJ ENGRG	A Guerrero	7-31-67
STRESS		

APPROVED FOR ATLANTIC RESEARCH _____ 19__
NAME DATE
APPROVED _____ 19__
NAME DATE

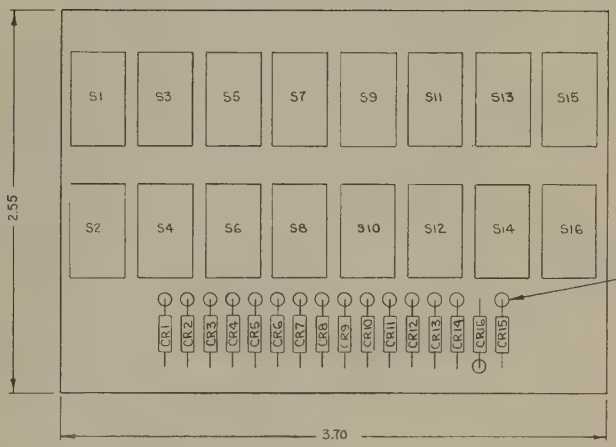
ATLANTIC RESEARCH CORPORATION
TELEPRODUCTS DIVISION
ALEXANDRIA, VIRGINIA

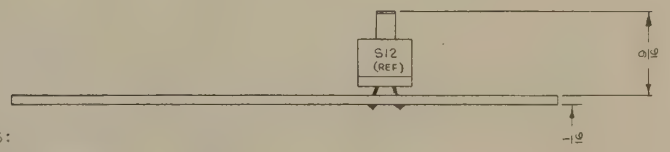
PRINTED CIRCUIT BOARD ASSEMBLY
TEST MESSAGE GENERATOR
BOARD "3"

CODE IDENT NO.	SIZE		REV
95335	D	TP-AD-415146 14	A LTR
SCALE 2/1			SHEET 1 OF 1

DASH NO.	NEXT ASSEMBLY	PROJECT
–	TP-FA-415206 14	TMG-2B
–	TP-FA-415206 14	TMG-3

APPLICATION





NOTES:

1. ALL DIMENSIONS ARE REFERENCE.
2. CIRCLE ○ INDICATES CATHODE END OF DIODE.

REVISIONS					
SYM	DESCRIPTION	DATE	BY	CHK	APPD

QTY REQD	PART OR IDENTIFYING NO.	ITEM NO.	DESCRIPTION	REF DESIG	MANUFACTURER

LIST OF MATERIALS OR PARTS LIST

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES.
TOLERANCES:
ANGLES ±
FRACTIONS ±
2 PLACE DECIMALS ±
3 PLACE DECIMALS ±
SURFACE ROUGHNESS √

DO NOT SCALE DRAWING

MATERIAL:

	BY	DATE
APPROVAL		
DRAWN	[signature]	6-28-67
CHECKED	R. S. Lane	7/7/67
ENGRG		
PROJ ENGRG	[signature]	7-31-67
STRESS		

APPROVED FOR ATLANTIC RESEARCH _____ 19 _____
NAME DATE

APPROVED _____ 19 _____
NAME DATE

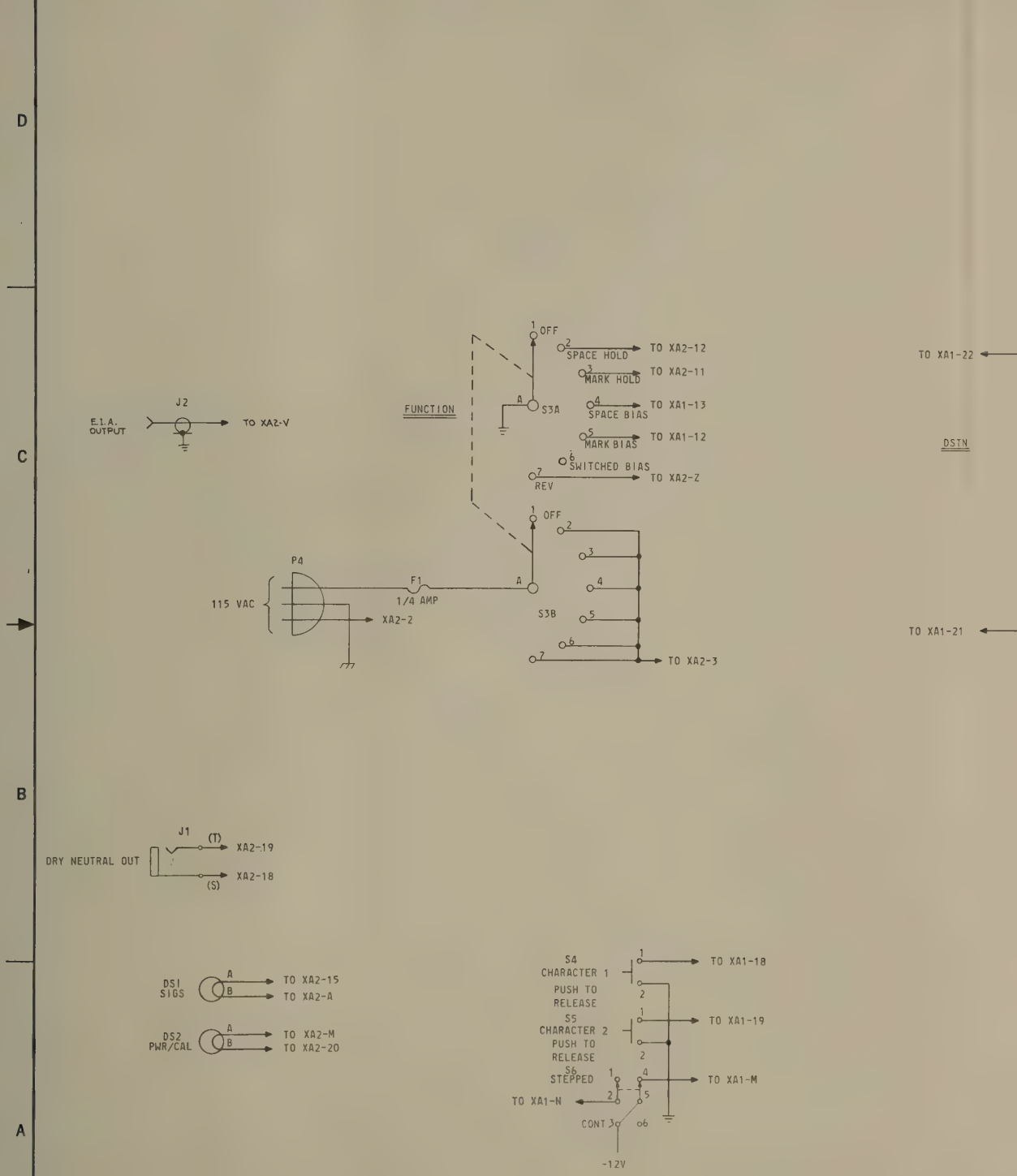
ATLANTIC RESEARCH CORPORATION
TELEPRODUCTS DIVISION
ALEXANDRIA, VIRGINIA

PRINTED CIRCUIT BOARD ASSEMBLY
BOARD "5"
TMG-3

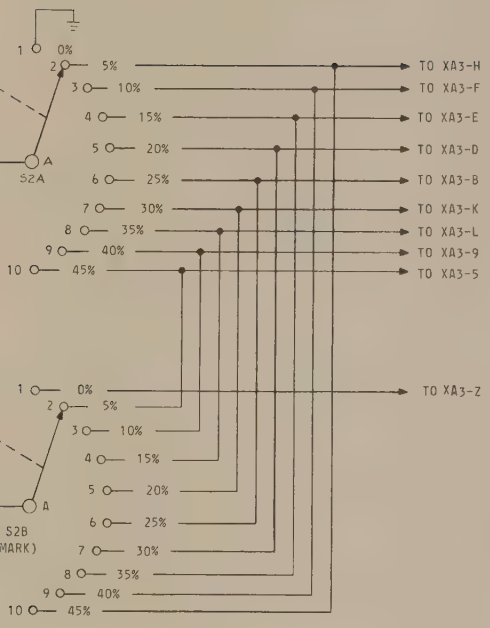
CODE IDENT NO.	SIZE		REV
95335	D	TP-AD-41505614	— LTR

SCALE 2/1 SHEET 1 OF 1

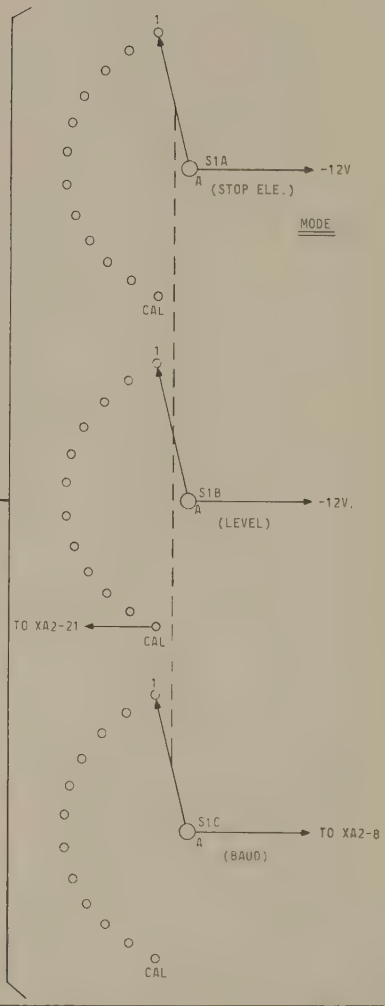
DASH NO.	NEXT ASSEMBLY	PROJECT
APPLICATION		


4
3
D
C
B
A
J2
E.I.A. OUTPUT
TO XA2-V
FUNCTION
1 OFF
2 SPACE HOLD
TO XA2-12
3 MARK HOLD
TO XA2-11
A
S3A
4 SPACE BIAS
TO XA1-13
5 MARK BIAS
TO XA1-12
6 SWITCHED BIAS
7 REV
TO XA2-Z
TO XA1-22
DSTN
P4
115 VAC
F1
1/4 AMP
XA2-2
S3B
TO XA2-3
TO XA1-21
J1
DRY NEUTRAL OUT
(T)
XA2-19
(S)
XA2-18
DS1 SIGS
TO XA2-15
TO XA2-A
DS2 PWR/CAL
TO XA2-M
TO XA2-20
S4 CHARACTER 1 PUSH TO RELEASE
TO XA1-18
S5 CHARACTER 2 PUSH TO RELEASE
TO XA1-19
S6 STEPPED
TO XA1-M
TO XA1-N
CONT
-12V

REVISIONS					
SYM	DESCRIPTION	DATE	BY	CHK	APPD
A	CIRCUIT REVISED PER DCN # 548	8 13 67	JC	[illegible]	[illegible]



FOR WIRING OF VARIOUS MODE SWITCH MODELS SEE SHEET



QTY REQD	PART OR IDENTIFYING NO.	ITEM NO.	DESCRIPTION	REF DESIG	MANUFACTURER

LIST OF MATERIALS OR PARTS LIST

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES.
TOLERANCES:
ANGLES ±
FRACTIONS ±
2 PLACE DECIMALS ±
3 PLACE DECIMALS ±
SURFACE ROUGHNESS
DO NOT SCALE DRAWING
MATERIAL:

	BY	DATE
APPROVAL		
DRAWN	[illegible]	6 29 67
CHECKED	[illegible]	7-11-67
ENGRG		
PROJ ENGRG	[illegible]	7-21 67
STRESS		

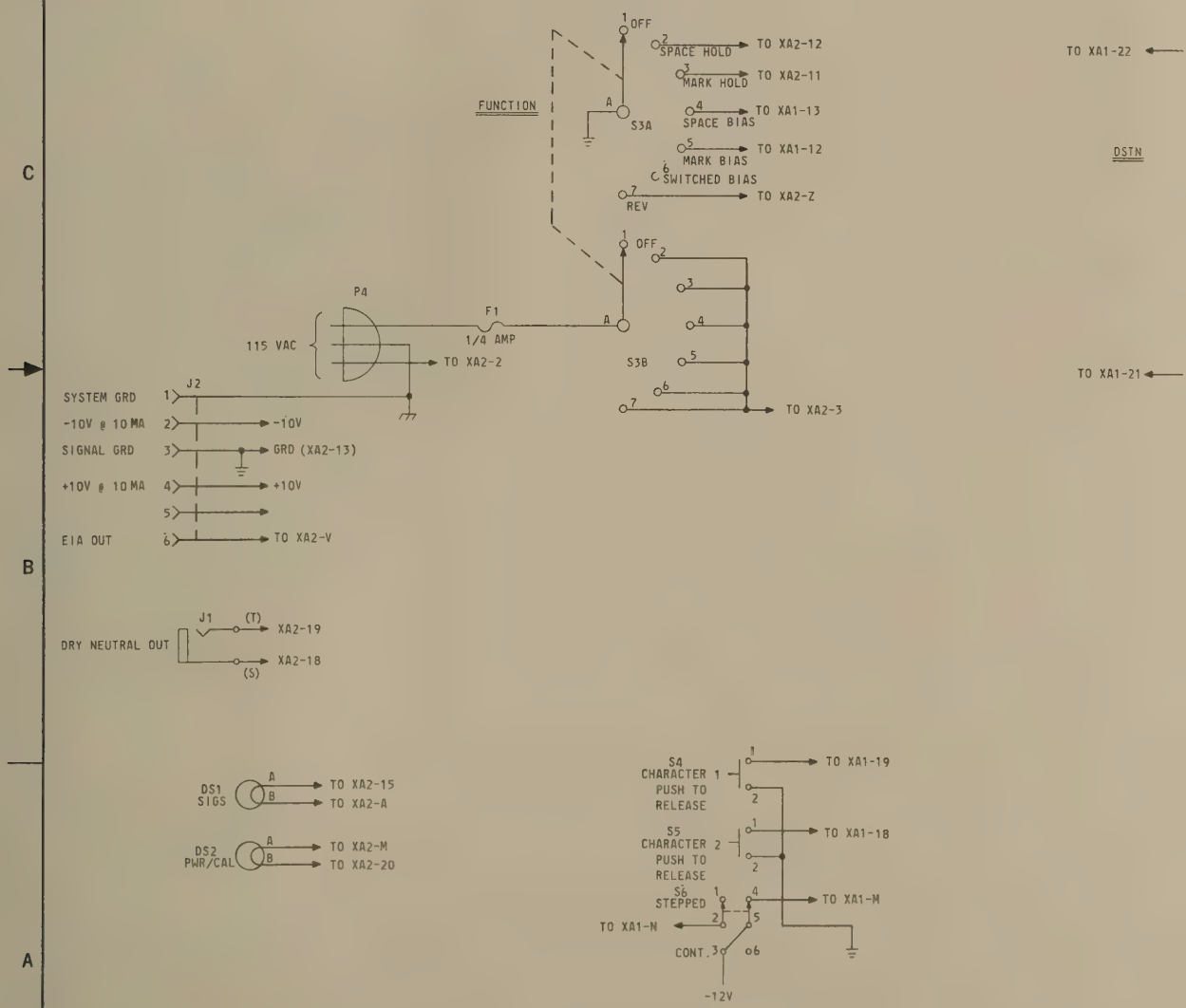
APPROVED FOR ATLANTIC RESEARCH _____ 19__
NAME DATE
APPROVED _____ 19__
COMPANY DATE

ATLANTIC RESEARCH CORPORATION
TELEPRODUCTS DIVISION
ALEXANDRIA, VIRGINIA

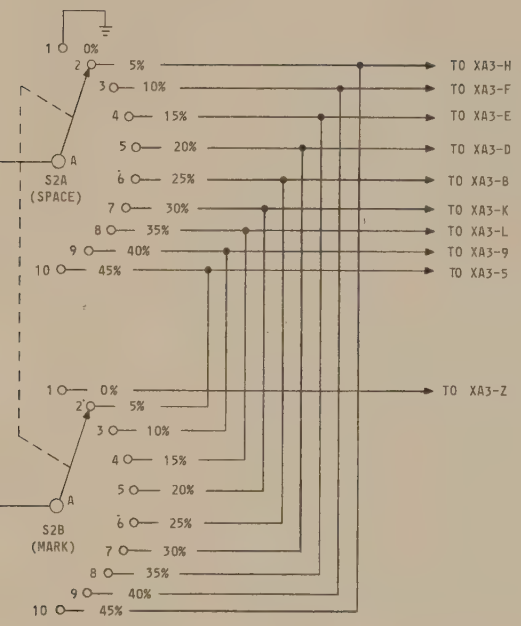
SCHEMATIC DIAGRAM
TEST MESSAGE GENERATOR CONTROL PANEL
TEST MESSAGE GENERATOR

CODE IDENT NO.	SIZE		REV
95335	D	ETP-SD-41512614	A LTR
SCALE			SHEET 1 OF 1

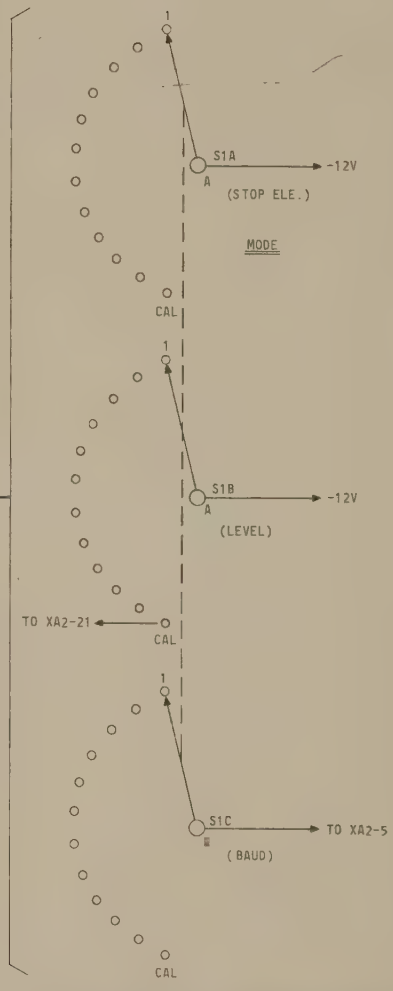
DASH NO.	NEXT ASSEMBLY	PROJECT
APPLICATION		


4
3
D
C
B
A
FUNCTION
1 OFF
2 SPACE HOLD
TO XA2-12
3 MARK HOLD
TO XA2-11
A
4 SPACE BIAS
TO XA1-13
S3A
5 MARK BIAS
TO XA1-12
6 SWITCHED BIAS
C
7 REV
TO XA2-Z
TO XA1-22
DSTN
P4
F1
1/4 AMP
115 VAC
TO XA2-2
S3B
TO XA1-21
TO XA2-3
J2
SYSTEM GRD 1
-10V @ 10 MA 2
-10V
SIGNAL GRD 3
GRD (XA2-13)
+10V @ 10 MA 4
+10V
5
EIA OUT 6
TO XA2-V
J1
(T)
DRY NEUTRAL OUT
XA2-19
XA2-18
(S)
DS1
SIGS
A
B
TO XA2-15
TO XA2-A
DS2
PWR/CAL
TO XA2-M
TO XA2-20
S4
CHARACTER 1
PUSH TO
RELEASE
TO XA1-19
S5
CHARACTER 2
PUSH TO
RELEASE
TO XA1-18
S6
STEPPED
TO XA1-M
TO XA1-N
CONT.
-12V

REVISIONS					
SYM	DESCRIPTION	DATE	BY	CHK	APPD
A	S6 & S2 SCHEMATIC REVISED PER DCN #532	9/11/67	J.C.	[illegible]	AR



FOR WIRING OF VARIOUS MODE SWITCH MODELS SEE SHEET 2



QTY REQD	PART OR IDENTIFYING NO.	ITEM NO.	DESCRIPTION	REF DESIG	MANUFACTURER

LIST OF MATERIALS OR PARTS LIST

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES.
TOLERANCES:
ANGLES ±
FRACTIONS ±
2 PLACE DECIMALS ±
3 PLACE DECIMALS ±
SURFACE ROUGHNESS √
DO NOT SCALE DRAWING
MATERIAL:

APPROVAL	BY	DATE
DRAWN	Joyce Conna	6-29-67
CHECKED	R.S. Davis	7/1/67
ENGRG		
PROJ ENGRG	A Quiros	8-1-67
STRESS		

APPROVED FOR ATLANTIC RESEARCH _____ NAME _____ DATE 19__
APPROVED _____ NAME _____ DATE 19__

ATLANTIC RESEARCH CORPORATION
TELEPRODUCTS DIVISION
ALEXANDRIA, VIRGINIA

SCHEMATIC DIAGRAM
TEST MESSAGE GENERATOR CONTROL PANEL
TMG 3-11

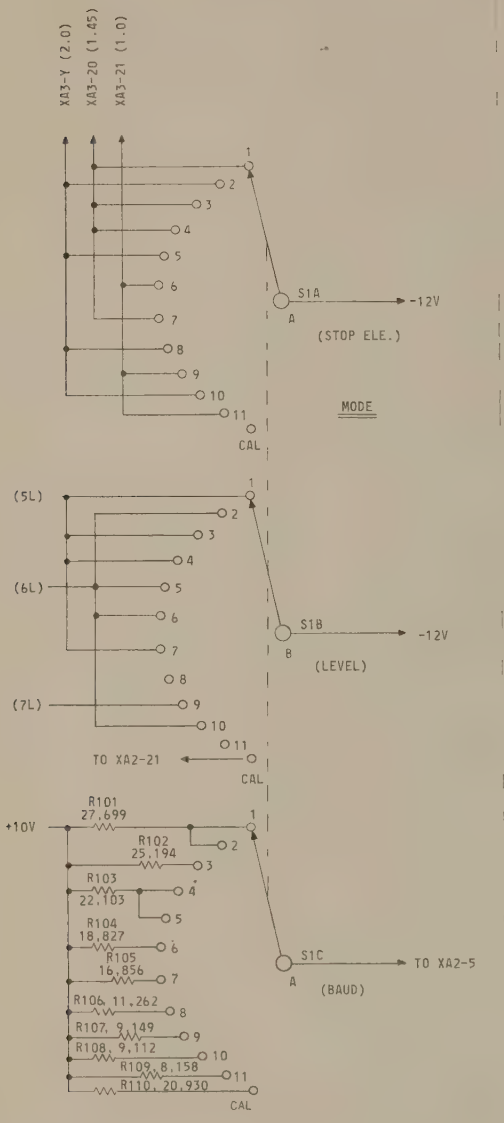
CODE IDENT NO.	SIZE		REV
95335	D	TP-SD-41513614	A LTR
SCALE			SHEET 1 OF 2

DASH NO.	NEXT ASSEMBLY	PROJECT
APPLICATION		

TABLE I

MODE	BAUD	LEVEL	STOP ELEMENT	WPM
1	45.5	5	1.45	60
2	45.5	6	2.0	53
3	50.0	5	1.45	66
4	56.9	5	1.45	75
5	56.9	6	2.0	66
6	66.7	6	1.0	83
7	74.2	5	1.45	100
8	110	8	2.0	100
9	134.49	7	1.0	
10	135	6	2.0	150
11	150	8	1.0	150

REVISIONS					
SYM	DESCRIPTION	DATE	BY	CHK	APPD



QTY REQD	PART OR IDENTIFYING NO.	ITEM NO.	DESCRIPTION	REF DESIG	MANUFACTURER

LIST OF MATERIALS OR PARTS LIST

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES.
TOLERANCES:
ANGLES ±
FRACTIONS ±
2 PLACE DECIMALS ±
3 PLACE DECIMALS ±
SURFACE ROUGHNESS
DO NOT SCALE DRAWING
MATERIAL:

APPROVAL	BY	DATE
DRAWN	[illegible]	7/31/67
CHECKED	[illegible]	8/1/67
ENGRG		
PROJ ENGRG	A Gauger	8-1-67
STRESS		

APPROVED FOR ATLANTIC RESEARCH NAME DATE 19
APPROVED NAME DATE 19

ATLANTIC RESEARCH CORPORATION
TELEPRODUCTS DIVISION
ALEXANDRIA, VIRGINIA

SCHEMATIC DIAGRAM
TEST MESSAGE GENERATOR CONTROL PANEL
TMG 3-11

DASH NO	NEXT ASSEMBLY	PROJECT
APPLICATION		

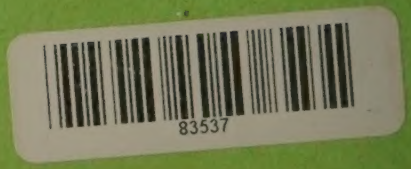
CODE IDENT NO	SIZE		REV
95335	D	TP-SD-41513614	A LTR
SCALE			SHEET 2 OF 2

WARRANTY

The Test Message Generator, TMG-3, carries a warranty for five (5) years. The warranty provides for all labor and material required to repair a defective unit the first year after the date of delivery. During the next four (4) years, all defective materials will be replaced by Atlantic Research. The customer will pay a minimum fee for replacement. All warranty repairs, except for certain fixed installations, will normally be made at our plant located in Alexandria, Virginia.

THE WARRANTY IS VOID WHEN A UNIT HAS BEEN SUBJECTED TO ABUSE, NEGLECT, ALTERATION OR IMPROPER INSTALLATION.

Fixed Installation. Teleproducts Field Engineering is available to care for problems which may arise from the operation of Teleproducts equipment. If these problems exist in the Teleproducts equipment, the above warranty prevails. If the problems are due to other equipment working into the Teleproducts equipment, a minimum charge will be made.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